



**INTEGRATION OF INFORMATION OPERATIONS THEORY INTO THE
CORPORATE AIR FORCE**

THESIS

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AFIT/GIR/ENG/08-02

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Abstract

The purpose of this research was to determine the desired end-state for company grade officers in terms of an information operations education. Specifically, an examination of company grade officer curricula from the pre-commissioning sources to the Squadron Officer College was performed. This assessment was then compared to the Air Force Institute of Technology Cyber Competency Areas Framework. Any areas that were missing from the current company grade officer curricula were identified and a proposed implementation plan was presented to correct these deficiencies. To aid in developing an implementation plan, redundancies between the two Squadron Officer College courses were identified. Furthermore, the Air Force process for determining subject content for Air Force professional military education was identified, as were potential ways to influence professional military education curricula.

This research resulted in several recommendations designed to bridge the gap between the current company grade officer curricula and the proposed company grade officer curricula, as determined by the Air Force Institute of Technology Cyber Competency Areas Framework.

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Thomas R. Kettles Jr.

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INTEGRATION OF INFORMATION OPERATIONS THEORY INTO THE CORPORATE AIR FORCE

I. Introduction

Background

On December 7, 2005, the United States Air Force revised its mission statement to reflect its new emphasis on cyberspace (Gettle, 2005). While the United States Air Force has been conducting operations in cyberspace for several decades, this declaration reflects the increased importance of cyberspace in the role of conducting successful peacetime and wartime operations.

Even though the Air Force has been operating in cyberspace for decades, many people still mistakenly use the terms cyberspace and information operations interchangeably, although they are distinctly different. Cyberspace is the domain that we operate in, akin to air or space. Information Operations on the other hand, is the capabilities we use in the cyberspace domain.

In order for the United States Air Force to successfully operate in cyberspace, it needs a professional cadre of Airmen--enlisted, officers, and civilians--who can 1) effectively use information operations in cyberspace, and 2) effectively integrate information operations with air and space operations.

With our current budget restrictions, decreasing manpower, and increased operations tempo, the United States Air Force is spending the majority of its focus on the first requirement of developing Airmen who can effectively employ information operations (i.e. the “trigger pullers”) in cyberspace. The United States Air Force

(hereafter simply referred to as the Air Force) is achieving this requirement in several ways. Examples include the reorganization of existing active duty Information Operations units into Network Warfare units, the changing of Air Force Reserve and National Guard units' missions, and the establishment of the Provisional Cyber Command.

While the first requirement is crucial to enable the Air Force to maintain its ability to achieve air and space superiority in the air and space domains, the Air Force would be remiss if it didn't focus on the second requirement of developing a professional force capable of integrating air, space, and information operations in a synergistic manner.

To satisfy this second requirement, it is vital the Air Force educate its personnel in information operations theory. As the cyberspace domain itself is continuously changing, it may also be time to evaluate the method of how information operations theory is taught in our professional military education programs. While the past model of in-residence professional military education was the norm for indoctrinating students in the profession of arms, this model may no longer be relevant.

In order for Airmen to effectively integrate information, air, and space operations in a seamless manner, these professionals will need to fully and accurately comprehend what constitutes information operations and what cyberspace truly consists of. While information operations and cyberspace may be easy to define, cyberspace will continue to challenge many people's visualization of a domain due to its inherent nature of overlapping with the air and space domains. This lack of observable boundaries will be a

continuing challenge that can be overcome with the embedding of information operations theory into the corporate Air Force.

Motivation for Research

The motivation for this research came from a 2006 Air Force Institute of Technology thesis by Major Timothy P. Franz titled “IO Foundations To Cyberspace Operations: Analysis, Implementation Concept, And Way-Ahead For Network Warfare Forces.” His thesis articulated the need to integrate information operations theory into the corporate Air Force. The purpose of this research effort is to evaluate and recommend possible approaches to the successful integration of information operations theory into the corporate Air Force by providing an implementation plan that focuses specifically on company grade officers.

Problem Statement

Due to the continuing evolution of technology and the increasing importance of the cyberspace domain, it is imperative the Air Force develops a cadre of professionals who can critically think across all domains. Without a solid information operations education, this task will be impossible. Furthermore, with an increased emphasis on limiting collateral damage and minimizing costs, combatant commanders will look more and more to cyberspace and information operations as a viable alternative to kinetic weapons. Failure to properly educate Air Force personnel will only limit the service’s ability to meet the combatant commanders’ requirements. In order to aid the Air Force in educating its personnel in information operations theory, this research will answer the following research question and investigative questions:

Research Question

What is the desired end-state for company grade officers in terms of an information operations education?

Investigative Questions

In order to answer the main research question, this research effort will answer several investigative questions:

1. What are we teaching Air Force company grade officers right now?
2. Is there a need to revise the current curricula at the company grade officer level?
3. What are the appropriate information operations curricula for company grade officers?
 - a) What are the core competencies that should be taught?
 - b) At what time periods should company grade officers be taught these competencies?
4. What is the Air Force process for determining what subjects are taught and at which levels?
5. How can we best influence the Professional Military Education Curricula?

Benefits/Implications of Research

Due to the combination of Air Force company grade officers learning air and space operations theory and the Air Force's documented experience, in the form of air and space doctrine, air and space operations are able to be successfully integrated into daily operations across the globe. However, due to the lack of documented experience in

the cyberspace domain, coupled with an absence of a standardized information operations education for company grade officers, it is difficult for Air Force professionals to effectively blend information operations with air and space operations.

This research effort will focus on bridging the gap between what is currently taught and what topics should be taught as determined by the Air Force Institute of Technology Cyber Competency Areas Framework. This framework will enable Air Force professionals to effectively integrate air, space, and information operations to meet future combatant commander requirements.

Methodology

An exploratory research approach was taken in this research effort. The first phase consisted of reviewing any pertinent documentation to develop enough expertise to answer this research effort's investigative questions. The second phase involved assessing two of the pre-commissioning sources' curricula via available syllabi, then reviewing the Squadron Officer College curricula to determine where gaps in integrating information operations theory into the corporate Air Force exist according to the Air Force Institute of Technology Cyber Competency Areas Framework. After these gaps were identified, recommendations for future courses of action are provided. To conclude this research effort, the process for identifying how the Air Force determines what to teach, as well as how to influence that process was examined.

Scope

While the author believes there is a need to develop an implementation plan for integrating information operations theory into the entire corporate Air Force, this research

specifically targets company grade officers. The company grade officer ranks were chosen as the pilot program for three reasons. First, the author is most familiar with the company grade officer ranks and education system. Second, many company grade officers are intimately familiar with technology; thus, they are more likely to embrace the concepts of cyberspace and information operations theory and be able to expand it, whether it be in the arenas of doctrine (which the author believes is sorely needed) or application. Third, the author believes it is critical that Air Force professionals are able to clearly articulate the importance of cyberspace and what the Air Force brings in the way of information operations to the fight. By focusing on the company grade officers, the Air Force has the best chance of embedding these concepts into its cultural psyche.

Assumptions

As with any research effort, there are several assumptions. First, a need exists for information operations theory to be more integrated into the United States Air Force. This assumption has been reinforced by the inclusion of the cyberspace domain into the Air Force's mission statement. Second, the cyberspace concepts that are presented in the implementation plan are valid and sound. These concepts have been vetted by information operations experts from around the Air Force, and thus are a good starting point for any future information operations educational programs.

Limitations

As with any research effort, there are several limitations. First, the author is not an expert in information operations. While the author was assigned to the Air Force Information Warfare Center's training office and possesses a rudimentary knowledge of

information operations theory, the author does not have any operational experience.

Second, the author does not have a background in any educational methodologies such as Instructional System Design methodology, nor is the author certified to teach or develop curriculum. With that said, this research follows a logical, methodological process, and the results should be useful to curriculum developers.

Research Outline

This chapter provided an overview of this research effort, to include the problem statement, motivation for research, and assumptions and limitations. A literature review will be presented in Chapter Two. Chapter Three is intended to present an assessment of the pre-commissioning sources' curricula, as well as the Squadron Officer College's curricula in terms of an information operations education. Chapter Four presents the Air Force Institute of Technology Cyber Competency Areas Framework and identifies gaps in the current curricula as well as redundancies. This chapter then concludes with several recommendations on how to bridge these gaps. Chapter Five provides a summation of the research as it applies to the integration of information operations theory into the ranks of Air Force company grade officers.

II. Literature Review

Chapter Overview

This chapter examines the relevant literature that pertains to the research question and supports the proposed implementation plan for integrating information operations theory into the corporate Air Force. In addition, the primary purpose of this chapter is to provide a common framework for the reader to understand the key principles that apply to forming a successful implantation plan. First, cyberspace and information operations will be properly defined. Second, the author will use the literature to differentiate between education and training. Last, an in-depth examination of the schools from the pre-commissioning to the primary professional military education levels will be conducted.

Cyberspace Defined

The definition of ‘cyberspace’ has evolved considerably from its first meaning. Originally, cyberspace was defined by science fiction writer William Gibson in his 1984 novel *Neuromancer* (Heylighen, 2006). Mr. Gibson defined it as “a consensual hallucination experienced daily by billions...A graphic representation of data abstracted from banks of every computer in the human system. Unthinkable complexity. Lines of light ranged in the nonspace of the mind, clusters and constellations of data” (Zalman, 2007). From this definition, cyberspace evolved to be defined as the World Wide Web or the Internet.

More recently, the White House, in its 2003 *National Strategy to Secure Cyberspace*, defined cyberspace as the “interdependent network of information

technology infrastructure...that is essential to our economy, security, and way of life” (White House, 2003). The White House’s definition didn’t define cyberspace as strictly a military domain; in addition to the military, it considers the information technology infrastructure to consist of both public and private sector institutions. Of interest in this document are the three national strategic objectives.

- Prevent cyber attacks against America’s critical infrastructures
- Reduce national vulnerability to cyber attacks
- Minimize damage and recovery time from cyber attacks that do occur (White House, 2003)

With the United States Air Force adding the cyberspace domain to its mission statement, the United States Air Force may become one of the key players in assisting the nation meet these three strategic objectives.

In 2006, the Department of Defense defined cyberspace in its *National Military Strategy for Cyberspace Operations* as “a domain characterized by the use of electronics and the electromagnetic spectrum to store, modify, and exchange data via networked systems and associated physical infrastructures” (Fahrenkrug, 2007).

All these definitions illustrate that cyberspace is the domain or location where information operations occur. Based on this definition, the United States Air Force has been operating in cyberspace for several decades, especially in the electronic warfare arena.

Furthermore, with the addition of the cyberspace domain to the United States Air Force mission statement, the Air Force has formally acknowledged that information

operations are now on par with air and space operations. Figure 1 provides an illustration of this new mindset.

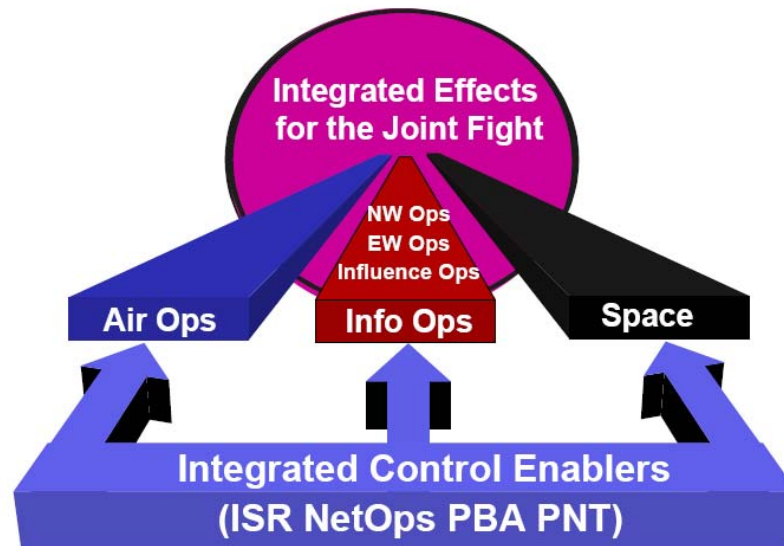


Figure 1: Integration of Air, Space, & Information Operations (United States Air Force, 2005)

Information Operations Defined

While the Department of Defense and United States Air Force agree on a definition of what cyberspace is composed of, they slightly differ from a doctrinal perspective of what information operations are.

Joint Publication 3-13, *Information Operations*, defines information operations as “the integrated employment of electronic warfare (EW), computer network operations (CNO), psychological operations (PSYOP), military deception (MILDEC), and operations security (OPSEC), in concert with specified supporting and related capabilities, to influence, disrupt, corrupt or usurp adversarial human and automated decision making while protecting our own” (Joint Chiefs of Staff, 2006).

According to Air Force Doctrine Document 2-5, *Information Operations*, information operations are “the integrated employment of the capabilities of influence operations, electronic warfare operations, and network warfare operations, in concert with specified integrated control enablers, to influence, disrupt, corrupt, or usurp adversarial human and automated decision making while protecting our own” (United States Air Force, 2005). The integrated control enablers are required to support the three pillars of information operations, as well as air and space operations (United States Air Force, 2005). These enablers include precision navigation and timing, network operations, predictive battlespace awareness, and intelligence, surveillance, and reconnaissance (United States Air Force, 2005). The unifying theme of Air Force information operations is to create effects on the Observe, Orient, Decide, and Act (OODA) loops (See Figure 2) of our enemies (United States Air Force, 2005). Therefore, information operations are the capabilities that are used in the cyberspace domain.

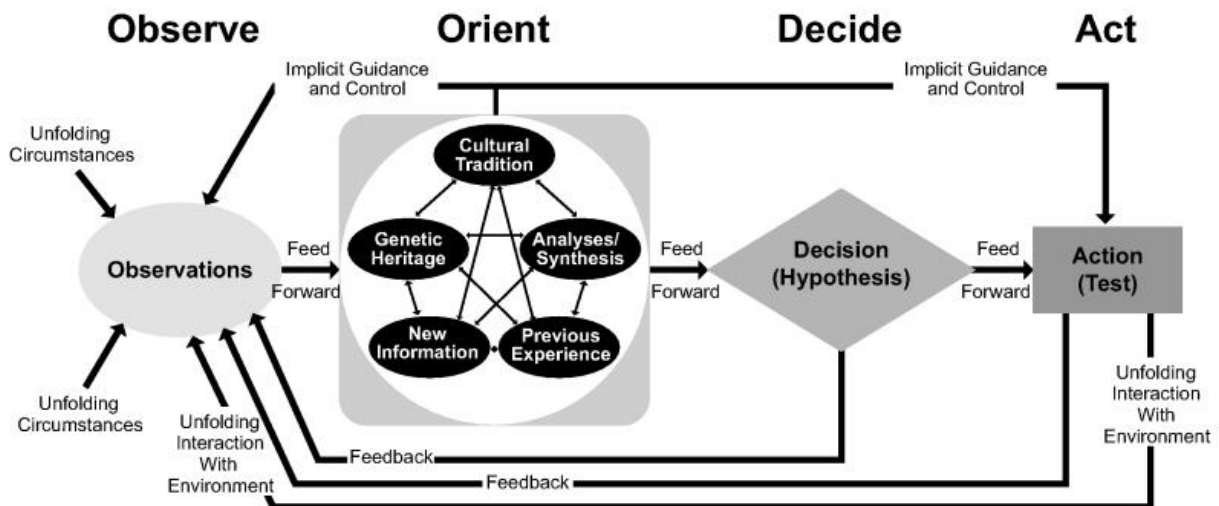


Figure 2: Observe, Orient, Decide, & Act Loop (Software Technology Support Center, 2007)

The difference between the Department of Defense's definition and the United States Air Force's definition of information operations is that the United States Air Force places OPSEC and MILDEC as subcategories under Influence Operations versus letting them stand alone as in the Department of Defense's definition. While this may seem a minor semantic issue, it can be argued that listing these two disciplines as subcategories diminishes their importance. In order to avoid confusion, it may be better to fully align the United States Air Force's definition with that of the Department of Defense's. The author believes this realignment would increase the potency of our information operations, as well as meet Joint Publication 1's, *Doctrine for the Armed Forces of the United States*, intent. According to this publication, United States Air Force doctrine must be aligned with joint doctrine {Joint Chiefs of Staff, 2007}.

Training versus Education

While many people may be unable to differentiate between the concepts of training and education due to their many similarities, it is imperative that these concepts be properly defined if the United States Air Force wants to effectively integrate information operations theory into the corporate Air Force.

Before one can review the United States Air Force's definition of education and training, a brief overview of Bloom's taxonomy is necessary. Dr. Benjamin Bloom published a book in 1956 titled *Taxonomy of Educational Objectives*. In his treatise, he defined three domains, which were the cognitive, affective, and psychomotor domains. The cognitive domain consists of "those objectives which deal with the recall or recognition of knowledge and the development of intellectual abilities and skills." The

affective domain consists of those “objectives which describe changes in interest, attitudes, and values, and the development of appreciations and adequate adjustment.” Lastly, the psychomotor domain consists of physical skills (Solseth, 2005).

Dr. Bloom further classified the cognitive domain into six classifications that many educators to build their lesson plans. These classifications are knowledge, comprehension, application, analysis, synthesis, and evaluation (University of Victoria's Counseling Services, 2007). This system is a hierarchical system, with each level building upon the previous level. The first category, knowledge, consists of observation and recall of information, knowledge of dates, events, and places, knowledge of major ideas, and mastery of subject matter. Questions cues (such as may be seen in a typical Air University sample of behavior) are list, define, tell, describe, identify, show, label, collect, examine, tabulate, quote, name, who, when, and where. The comprehension category consists of understanding information, grasping meaning, translating knowledge into a new context, interpreting, comparing and contrasting facts, ordering, grouping, and inferring causes, and predicting consequences. Typical question cues are to summarize, describe, interpret, contrast, predict, associate, distinguish, estimate, differentiate, discuss and extend (University of Victoria's Counseling Services, 2007).

The third category is application. This category consists of using information, methods, concepts, and theories in new situations, and solving problems using required skills or knowledge. Typical question cues are apply, demonstrate, calculate, complete, illustrate, show, solve, examine, modify, relate, change, classify, experiment, and discover. The fourth category, analysis, is composed of seeing patterns, organization of

parts, recognition of hidden meanings, and identification of components. Question cues are analyze, separate, order, explain, connect, classify, arrange, divide, compare, select, explain, and infer (University of Victoria's Counseling Services, 2007).

The fifth category of Bloom's taxonomy is synthesis. This category uses old ideas to create new ones, generalizes from given facts, relates knowledge from several areas, and predicts and draws conclusions. Question cues for this category are combine, integrate, modify, rearrange, substitute, plan, create, design, invent, compose, formulate, prepare, generalize and rewrite.

The final category is evaluation. In this category, an individual is asked to compare and discriminate between ideas, assess the value of theories and presentations, make choices based on reasoned argument, verify the value of evidence, and recognize subjectivity. Question cues are access, decide, rank, grade, test, measure, recommend, convince, select, judge, explain, discriminate, support, conclude, compare, and summarize (University of Victoria's Counseling Services, 2007).

Now that we have identified the three domains of learning as defined by Dr. Bloom and his six categories of the cognitive domain, we can begin to review the differences between training and education.

Training is mostly conducted in the psychomotor domain, although training is also used in the first two categories of the cognitive domain (Kline, 1985). In contrast, education is conducted in the later four categories of the cognitive domain (Kline, 1985). According to Dr. Kline, training is a closed system, where there is a "right" answer for each question, and each student's response will look the same. Education on the other

hand, is an open system, where there may be more than one “right” answer, depending on the situation (Kline, 1985).

According to Air Force Doctrine Document 1-1, *Leadership and Force Development*, training is most appropriate when the situation calls for a standardized output, is task dependent, is technically specific, requires restrictive applications, and functions best within defined parameters and expected environments. Training’s value decreases as uncertainty increases. Most importantly, training usually results in short-term benefits (United States Air Force, 2006).

In contrast, education is more appropriate when the situation requires an adaptive outcome, is process dependent and not dependent on the situation, requires transformative application, and functions best outside of the defined parameters and expected environments. Education’s value increases as uncertainty increases. Most importantly, education usually results in long term benefits (United States Air Force, 2006).

As cyberspace and information operations continue to evolve, it is critical that the United States Air Force shift some of its focus from training (i.e., the trigger pullers) to education in order to develop the next generation of Airmen who can operate in cyberspace while also using their critical thinking skills to properly integrate information operations with air and space operations.

Company Grade Education Levels

The company grade officer educational system begins at the pre-commissioning level and progresses to the primary professional military education level. The pre-

commissioning level consists of three parts: the United States Air Force Academy, the Air Force Reserve Officer Training Corps, and the Officer Training School.

The United States Air Force Academy, located in Colorado Springs, Colorado, is the service school for the United States Air Force. Its mission is to “educate, train and inspire men and women to become officers of character, motivated to lead the United States Air Force in service to our nation” (United States Air Force Academy, 2008). Cadets at the academy receive 96 core hours of instruction, consisting of 48 semester hours in basic sciences and engineering and 43 hours in social sciences and humanities, along with 5 hours of physical education courses (United States Air Force Academy, 2006). In addition to these core hours, cadets have the option of choosing one of 32 academic majors (United States Air Force Academy, 2006). By legislation, the United States Air Force Academy’s student wing is limited to 4,000 cadets (United States Air Force Academy, 2005).

The Air Force Reserve Officer Training Corps and Officer Training School fall under the Headquarters, Air Force Officer Accession and Training Schools, located at Maxwell Air Force Base, Alabama. The Air Force Reserve Officer Training Corps detachments are physically located on 144 college campuses and commissions approximately 2,000 second lieutenants each year (Air Force Officer Accession and Training Schools, 2006). The Air Force Reserve Officer Training Corps’ mission is to “develop quality leaders for the Air Force” (United States Air Force Reserve Officer Corps, 2008). Air Force Reserve Officer Training Corps cadets’ studies are focused in four core areas:

- Profession of Arms
- Communication Skills
- Leadership Skills
- Military Skills/International Security Studies (United States Air Force Reserve Officer Corps, 2008)

The Officer Training School is also located at Maxwell Air Base, Alabama, and commissions approximately 2,000 second lieutenants per year (Air Force Officer Accession and Training Schools, 2006). The Officer Training School's mission is to "develop today's leaders for tomorrow's Air Force" (Officer Training School, 2006). The overall objective of the school is to "produce a world-class officer of character possessing the American warrior ethos, prepared to lead Airmen, and embodying the Air Force Core Values" (Air Force Officer Accession and Training Schools, 2007).

The Officer Training School possesses the flexibility to surge its commissioning ability and has commissioned as many as 7894 second lieutenants in one year to meet wartime requirements (Air Force Officer Accession and Training Schools, 2006). The Officer Training School's curriculum focuses on the same four areas as the Air Force Reserve Officer Training Corps' curriculum. Officer Trainees spend 162.5 class hours and 168 study hours in these four core areas (Air Force Officer Accession and Training Schools, 2007). Now that we have looked at the primary pre-commissioning sources, let's examine the primary professional military education schools.

The Squadron Officer College, also located at Maxwell Air Force Base, Alabama, is comprised of two schools: the Squadron Officer School and the Air and Space Basic

Course. These two schools provide a foundational experience for company grade officers in the development of Air Force leadership.

The first level of professional military education is the Air and Space Basic Course. This course was designed to teach second lieutenants how their jobs relate to overall mission accomplishment, while also understanding their roles as Airmen (Air and Space Basic Course, 2007). The mission of the Air and Space Basic Course is to:

To inspire new United States Air Force officers to comprehend their roles as Airmen who understand and live by United States Air Force core values, can articulate and advocate what Air, Space, and Cyberspace power brings to the fight, and are dedicated as warriors in the world's most respected Air, Space, and Cyberspace Force (Air and Space Basic Course, 2006).

The Air and Space Basic Course has 4 main goals, which are closely aligned with the course's mission. These four goals are:

1. Comprehend Air, Space, and Cyberspace operations as the primary means for effectively employing Air, Space, and Cyberspace power as a part of the joint warfighting team.
2. Comprehend Air Force history, doctrine, and distinctive capabilities as the foundation for the effective employment of Air, Space, and Cyberspace power.
3. Embrace the profession of arms by applying the Air Force core values with the heart, mind, and body of an Air, Space, and Cyberspace warrior.
4. Value the expeditionary Air, Space, and Cyberspace force as a team, and the role of Air Force officers in leading within the team (Air and Space Basic Course, 2006).

The second level of professional military education for company grade officers is Squadron Officer School. This course was designed to provide United States Air Force Captains who have four to seven years of commissioned service with a solid foundation to develop their critical thinking skills in the air and space arenas (United States Air Force, 1996).

The mission of the Squadron Officer School is “To develop dynamic Airmen ready to lead Air, Space, and Cyberspace power in an expeditionary warfighting environment” (Squadron Officer School, 2007). A primary objective is that “educated students will value their unique role as Air Force officers by applying Air, Space, and Cyberspace leadership to effectively execute military missions, and valuing the warrior-leader ethos and its impact on Air, Space, and Cyberspace development” (Squadron Officer School, 2007).

Summary

This chapter discussed the concepts of cyberspace and information operations, the differences between education and training, and the education provided to United States Air Force Company Grade Officers. Chapter Three will answer the first two investigative questions. Chapter Four will then answer the last three investigative questions. Chapter Five provides a summation of the research as it applies to the integration of information operations theory into the ranks of Air Force Company Grade Officers.

III. Methodology

Chapter Overview

This chapter will answer the first two investigative questions that were introduced in the first chapter of this research effort. These questions will be answered by performing an assessment of the information operations education that company grade officers receive, from the pre-commissioning sources to the Squadron Officer School. After this assessment, an examination of whether a need exists to revise the current curricula will be conducted.

Investigative Question Number One

1. What are we teaching Air Force company grade officers right now?

Currently, when a company grade officer is eligible for promotion to the field grade officer ranks, there is a strong possibility that they have received a minimal information operations education. Let's examine how this is possible from a chronological perspective.

First, while the Air Force has embraced its new mission of providing sovereign options in the air, space, and cyberspace domains, the pre-commissioning sources have not revised their curricula to reflect this fact. As an example, let's briefly examine the curriculum of Air Force Reserve Officer Training Corps Detachment 225 at Notre Dame University.

The Air Force Reserve Officer Training Corps curriculum is broken into four main components (AS101, AS201, AS301, AS401). The first two lessons, AS101 and

AS201 comprise the general military courses. The last two lessons, AS301 and AS 401 form the professional officer courses.

The first block of instruction, AS101, *Foundations of the Air Force*, is designed to give cadets a general overview of the Air Force. The course objectives for block AS101, as taken from an unpublished Air Force Institute of Technology course paper are as follows:

- a. Structure and opportunities of Air Force Reserve Officer Training Corps
- b. Air Force Reserve Officer Training Corps scholarships and incentive programs
- c. Air Force dress and appearance standards
- d. Major historical events, leaders, and milestones that contributed to the development of the Air Force
- e. Air Force organization
- f. Air Force weapon systems
- g. Air Force career opportunities
- h. Air Force benefits
- i. Air Force installations (Fredberg & Svanberg, 2007)

Fredberg and Svanberg wrote this paper from the perspective of recent Air Force Reserve Officer Training Corps graduates.

The second block, AS201, *The Evolution of Aerospace Studies*, is designed to give the cadets a foundation in the history of manned flight and aerospace power development, as well as inform the cadets of the current uses of aerospace power to support peacetime missions such as scientific studies (United States Air Force Reserve Officer Corps, 2008). The third block of instruction, AS301, *Leadership Studies*, is

intended to provide an overview of Air Force leadership practices through the use of case studies and a leadership laboratory (United States Air Force Reserve Officer Corps, 2008).

The final block, AS401, *National Security Studies and Preparation for Active Duty*, provides instruction in various subjects. These subjects include military law, societal attitudes towards the military, the role of the professional officer in a democratic society, and the impact of international developments and technology on the overall policy-making process (United States Air Force Reserve Officer Corps, 2008). This block covers such a broad spectrum of subjects, as shown in Table 1.

Table 1: Air Force ROTC AS 400 Course Lesson Plan (Fredberg & Svanberg, 2007)

Lesson		Lesson	
51	Advocacy Briefing and Prep	39	The Enlisted Evaluation System
52	Bullet Statements with Impact	40	EPR Assessment
32	Law of Armed Conflict	41	Officer Evaluations System
33	Uniform Code of Military Justice (UCMJ)	42	Officer Force Development
34	Military Law	43	AF Complaint and Fraud, Waste and Abuse
35	Military Law Case Studies	44	Security Education
36	Feedback	45	Sexual Harassment Awareness & Case Studies
37	Feedback Assessment	46	Substance Abuse Control Program
25	Setting the World Stage-review	47	Suicide Awareness
26	Africa in Transition		Student Briefings
27	East Asia in Transition	48	Operational Risk Management
28	Latin America in Transition	49	The Oath of Office and Commissioning
29	Europe	53	Uncompromising Character in Officer Corps
30	The Middle East in Transition	50	NCO Perspective
31	Russia and Former Soviet Republics in Transition	54	Civilian Personnel
38	The Enlisted Force	55	Information Assurance and Computer Security

While there is a lesson dedicated to information assurance and computer security, there is no evidence of either cyberspace or the three pillars of information operations being taught in the Air Force Reserve Officer Training Corps curriculum. While information assurance and computer security are part of information operations, there are numerous other aspects of information operations that should be emphasized at this level of a cadet's education.

Another pre-commissioning source, the Air Force Officer Training School, fares equally poor in providing an information operations education to its trainees. According to the Air Force Officer Training School syllabus dated August 2007, while the curriculum requires students to have 162.5 contact hours and 168 study hours in leadership studies, communications studies, military/international security studies, and the profession of arms in order to meet graduation requirements, it only has one lesson that directly addresses a facet of information operations. This course, PA-4D, *Information Assurance and Computer Security*, lists its objective as knowing the fundamental aspects of information assurance and computer security. The lesson description states that this lesson is intended to challenge the trainees to take an active role in maintaining computer security. This course is composed of one hour of contact time and one hour of study time, and is taught in the forty-seventh training day (Air Force Officer Accession and Training Schools, 2007).

The Air Force Officer Training School also has another lesson, PA-2E, *Air and Space Functions*, which addresses the counterinformation and command and control functions, as well as the integrated control enablers of navigation/positioning and

intelligence, surveillance, and reconnaissance. This lesson consists of one study hour and two contact hours, and is conducted on the seventeenth training day (Air Force Officer Accession and Training Schools, 2007).

Second, even though the Air and Space Basic Course has revised its mission and course goals, there are currently no lessons dedicated to providing second lieutenants with a solid foundation in information operations. The closest block that resembles an information operations lesson is A1430, *Intelligence, Surveillance, and Reconnaissance*.

This lesson has two objectives: first, to know the concept of Intelligence, Surveillance, and Reconnaissance Operations, and second, to know how intelligence, surveillance, and reconnaissance enhance warfighting (E. Litz, personal communication, January 22, 2008). The overall purpose of this lecture is to understand the basic intelligence, surveillance, and reconnaissance principles, while focusing on the information-in-warfare portion of information operations (E. Litz, personal communication, January 22, 2008). This block consists of one contact hour and thirty-two minutes of student preparation time, for a total of one hour and thirty-two minutes of information operations education (E. Mills, personal communication, November 29, 2007).

As for the actual course content, lesson A1430 teaches students how the intelligence, surveillance, and reconnaissance transformation model changes collected data into usable products. In addition, basic and joint intelligence, surveillance, and reconnaissance doctrine, which includes predictive battlespace awareness, is covered along with the principles of intelligence, surveillance, and reconnaissance. Furthermore,

this lesson delves into the five intelligence collection disciplines. The lesson ends with an overview of the entire intelligence process (E. Litz, personal communication, January 22, 2008)

While the author believes that intelligence, surveillance, and reconnaissance play a vital role in our day-to-day operations, this is definitely not sufficient as the foundational lesson in information operations. To the Air and Space Basic Course Cadre's credit, they also have realized this fact. Their current plan is to implement a new lesson beginning in March 2008, titled *Netcentric Warfare* (E. Mills, personal communication, November 29, 2007).

This new lesson will focus on four main areas. These four areas are the history of netcentric warfare, with a particular emphasis on John Boyd's Observe, Orient, Decide, and Act (OODA) Loop, what netcentric warfare consists of, netcentric warfare concerns, and how the Air Force fits into netcentric warfare (E. Jones, personal communication, January 23, 2008).

In addition to the four areas identified above, the new Air and Space Basic Course lesson is projected to define cyberspace, illustrate each Airmen's role in cyberspace, as well as provide a case study to demonstrate the threats to cyberspace. Lastly, the new lesson differentiates information operations from cyberspace and netcentric warfare (E. Jones, personal communication, January 23, 2008).

Third, at the Squadron Officer School, there is currently one lesson that is being taught that addresses information operations. This lesson is titled *Information Operations* and possesses two objectives. These objectives are to comprehend information

operations and to value the importance of strong, knowledgeable leadership in implementing information operations capabilities as it relates to the Air Force mission statement (E. Swartzter, personal communication, January 22, 2008). The overall purpose of the lesson is for students to understand how information operations affect other Air Force operations. In addition, this lesson seeks to compare and contrast Air Force and joint information operations doctrine, as well as define how the different armed services, agencies, and other nations work together to successfully employ information operations (E. Swartzter, personal communication, January 22, 2008). This lesson consists of one contact hour and one hour and 54 minutes of student preparation time, for a total of 2 hours and 54 minutes of information operations education (E. Mills, personal communication, November 29, 2007).

As far as actual content, lesson S1230 addresses three main sections. The first section is the nature of information operations. Under this heading, information operations are defined, the real impact of technology along with the technology revolution is reviewed, and potential threats are identified. In the second section, Air Force Information Operations Doctrine, the three pillars of information operations, are explored in detail. In addition to the three pillars, students are exposed to the integrated control enablers and the role they play in information operations. In the last section, Joint Information Operations versus Air Force Information Operations Doctrine, the differences between joint doctrine and Air Force doctrine are examined. The lesson concludes with a warrior's perspective of information operations, when information

operations are performed, and what information operations can bring to the fight (E. Peek, personal communication, February 20, 2008).

Investigative Question Number Two

2. Is there a need to revise the current curriculum at the company grade officer level?

In order to answer this investigative question, an examination of the current guidance and directives, from the congressional bodies to the senior Air Force leadership is warranted.

First, with the revamping of the Air Force mission, it seems only logical that our educational system would need to change. The Air Force has literally decided to place an emphasis on a new domain, which is cyberspace. While the Air Force has been operating in this domain for decades, this renewed emphasis requires a massive shift in the culture of the Air Force and the psyche of its personnel. These changes are necessary if the Air Force is to successfully embrace the new domain and its associated capabilities. Air Force senior leadership has recognized that cyberspace is no longer a supporting domain, but is on par with air and space operations.

To further reinforce this point, on November 1, 2006, General T. Michael Moseley directed Lieutenant General Robert J. Elder, Commander, 8th Air Force, to take on the role of integrating Air Force kinetic and non-kinetic strike capabilities, with the authority to assume the Commander Air Force responsibilities for all Air Force cyberspace elements. As part of General Moseley's charge, the 8th Air Force was mandated to provide trained personnel who can conduct both offensive and defensive

information operations in combination with air and space operations. The Chief of Staff also directed the 8th Air Force Commander to develop a plan to fully integrate cyber across Air Force training, doctrine, and education. Overall, the purpose of this memorandum was to redefine air power (Moseley, 2006).

Besides the Air Force senior leadership realizing that it needs to strengthen the information operations and cyberspace awareness among its personnel, there are numerous documents, both inside and outside of the Air Force, which state a need exists for integration of information operations theory into professional military education.

From a chronological perspective, the first call to integrate any form of an information operations education into the Department of Defense came from a Defense Science Board Task Force in 1996. In a report titled *Report of the Defense Science Board Task Force on Information Warfare – (IW-D)*, the Defense Science Board Task Force provided more than 60 recommendations to better equip the Department of Defense with the ability to function in an information warfare environment. Of interest to this research effort was recommendation 10c, which stated that the Secretary of Defense should implement information warfare awareness courses into the Department of Defense's professional military education schools, with a particularly strong emphasis on operational preparedness (Defense Science Board, 1996).

Next, the 2003 Department of Defense Information Operations Roadmap noted that the 2001 Quadrennial Defense Review identified information operations as one of six critical operational goals that the Department of Defense's transformation efforts should be focused on. A key objective of the information operations roadmap is to make

information operations a core competency, on par with land, air, space, and sea. In order for this objective to be met, the roadmap calls for an educated information operations career field. Also, the roadmap directs the Joint Forces Staff College to take the lead on developing and incorporating joint information operations curricula into each service school (Department of Defense, 2003).

Furthermore, the 2003 Department of Defense Information Operations Roadmap highlights the fact that the military population, as a whole, has a poor grasp of information operations. One of the remedies the roadmap proposes is introducing joint learning areas for information operations at the company grade officer level (Department of Defense, 2003).

With the revision of Air Force Doctrine Document 2-5 in January of 2005, the Air Force stated that all Airmen should have a basic understanding of information operations. This document also states that the objective of an information operations education is to ensure Air Force members understand information operations characteristics, principles, and concepts. Lastly, Air Force Doctrine Document 2-5 further points out that education will be the vehicle that embeds information operations into the Air Force culture (United States Air Force, 2005).

In addition to the 2005 revision of Air Force Doctrine Document 2-5, Department of Defense Instruction 3608.12, *Joint Information Operations Education*, directs that joint information operations education programs assist in the transformation of information operations into a core competency. Furthermore, this instruction states that

the services will use their professional military education programs to expand their service's knowledge of information operations (Department of Defense, 2005).

Additionally, the Chairman of the Joint Chiefs Of Staff Instruction 1800.01C, *Officer Professional Military Education Program*, actually states that information operations will be taught at the primary professional military education schools and pre-commissioning sources. At the pre-commissioning sources, the objective is for cadets to understand the fundamentals of information operations. In the primary professional military education schools (i.e., the Air and Space Basic Course and the Squadron Officer School), the objective should be to comprehend information operations effects and their implications on tactical operations (Chairman of the Joint Chiefs of Staff, 2005).

Moreover, a recent article in the IO Sphere, which is a professional journal of joint operations, published by the Joint Information Operations Warfare Center at Lackland Air Force Base, contained an article titled *Strategic Communications: An Expanded IO Role?* This article identified educating senior Department of Defense and service leaders on the validity of information operations as an alternative to traditional kinetic weapons as one of the information operations community's main challenges (Perkins, 2006). By successfully incorporating information operations theory into the corporate Air Force via the professional military education system, there is a strong possibility that this challenge can be overcome in the future.

Finally, while the new draft version of Air Force Doctrine Document 1-1, *Leadership and Force Development*, doesn't explicitly list information operations as an institutional competency that needs to be taught, it does list Employing Military

Capabilities as an institutional competency. This institutional competency is further broken down into three institutional subcompetencies, all of which pertain to information operations. The first institutional subcompetency is operational and strategic art, which information operations are a part of. The second institutional subcompetency is understanding unit, joint, and coalition capabilities. As technology continues to evolve, this subcompetency will play a greater and greater role in the cyberspace domain, as other armed services and coalition countries embrace information operations over traditional kinetic weapons. The last institutional subcompetency is non-adversarial crisis response. In today's world of instantaneous media attention, this institutional subcompetency will play a critical role in future Air Force operations. Of the three pillars of information operations, influence operations will play a huge role satisfying this last institutional subcompetency. As the draft version of Air Force Doctrine Document 1-1 points out, institutional competencies and core values together are used to develop Air Force leaders (United States Air Force, Draft). Hence, while Air Force Doctrine Document 1-1 doesn't explicitly state a need to teach information operations theory to Air Force professionals, tacitly it does state a need exists for future Air Force leaders to be able to effectively blend information operations with air and space operations.

Summary

This chapter answered the first two investigative questions that were presented in Chapter One. The first investigative question was answered by performing an assessment of the professional military education a company grade officer receives, from pre-commissioning to the primary professional military education level. The second

investigative question was answered by reviewing the relevant documentation from outside the Air Force, as well as from inside the Air Force, that states a need exists to integrate information operations theory into the corporate Air Force. Chapter Four will answer the last three investigative questions. Chapter Five provides a summation of the research as it applies to the integration of information operations theory into the ranks of Air Force Company Grade Officers.

IV. Analysis and Results

Chapter Overview

This chapter will answer the third, fourth, and fifth investigative questions that were introduced in the first chapter of this research effort. These questions will be answered in three phases. The first phase will consist of reviewing the portions of the Air Force Institute of Technology Cyber Competency Areas Framework that pertain to the company grade officer ranks. The next phase will involve defining the Air Force process for determining which subject content is taught. The third phase will provide insights into how the professional military education curriculum process can be influenced. After these three investigative questions are answered, gaps in the current company grade officer curricula as determined by the Air Force Institute of Technology Cyber Competency Areas Framework will be identified, as will redundancies between the curricula at the Air and Space Basic Course and the Squadron Officer School. This chapter will conclude with some recommendations to bridge the gap between current curricula and future curricula, in terms of an information operations education.

Investigative Question Number Three

3. What is the appropriate information operations curriculum for company grade officers?
 - a) What are the core competencies that should be taught?
 - b) At what time periods should company grade officers be taught these competencies?

In order to determine the subject matter that should be taught to junior company grade officers, an academic working group at the Air Force Institute of Technology, headed by Doctor Robert Mills, generated a list of proposed cyber competency areas for the officer and enlisted ranks. After this list of competencies was generated, it was sent to numerous information operations experts around the Air Force for their comments, deletions, and additions. In addition to the Air Force Information Operations experts, this document was also shared within the Air University Community.

Using the feedback received, the Air Force Institute of Technology working group identified six main cyber competency areas as shown in Figure 3.

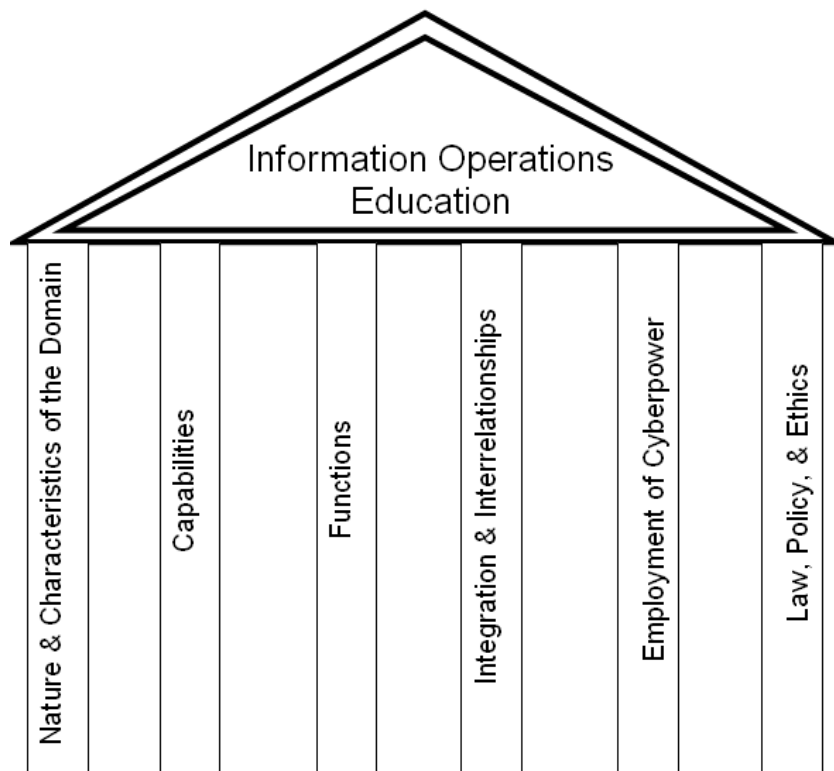


Figure 3: Air Force Institute of Technology Cyber Competency Areas Framework (Mills, Raines, & Williams, 2007)

As depicted, these six areas form a base upon which to build a solid information operations education. By using this framework as a reference point, the current company grade officer professional military education system can be modified to incorporate information operations theory into the corporate Air Force. Table 2 illustrates the six main competency areas in further detail.

Table 2: Air Force Institute of Technology Cyber Competency Areas in More Detail

<p style="text-align: center;"><u>Nature & characteristics of the domain</u></p> <ul style="list-style-type: none"> • Military domain of operations is where we conduct operations to achieve effects • Cyberspace is an operational area consisting of the entire electromagnetic spectrum (EMS) and electronic systems • Compare & contrast with other domains of air, land, space, and sea • Cyberspace domain transcends all other domains <p style="text-align: center;"><u>Capabilities</u></p> <ul style="list-style-type: none"> • The AF has a broad range of capabilities that operate in the cyberspace domain, including network warfare (NW) and electronic warfare (EW) and influence operations • Capabilities include offense, defense, and support • Synergistic application of cyber and non-cyber capabilities in other domains <p style="text-align: center;"><u>Functions</u></p> <ul style="list-style-type: none"> • AF functions are performed to achieve effects in support of national security objectives • Strategic attack, cyberspace control, cyberspace interdiction, etc. • Functions include Integrated Control Enablers (+ counter space) <p style="text-align: center;"><u>Integration & interrelationships</u></p> <ul style="list-style-type: none"> • Interrelationship between air, space, and cyberspace forces is complex. • Cyberspace capabilities can support & enhance activities in other domains • Activities in other domains can support & enhance cyberspace operations • Integrating these capabilities at the operational level is complex • Detailed integration between services/components and other governmental (including law enforcement) agencies is required for offensive and defensive operations
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Employment of Cyberpower

- Cyberpower theory and doctrine
- Tracing from strategy/policy to theory to operational tasks
- Employing/integrating cyberpower into the joint planning process
- Instruments of national power – cyberspace increasing the importance of information
- Organizing for effective employment of cyberpower
- Tenets / principles of air/space/cyberpower
- Control / dominate of all three domains—whoever controls cyberspace can control the other domains
- 24 x 7 x 365 cyber effects at all levels of war

Law, policy & ethics

- US laws (criminal, administrative, and civil)
- Restrictions on what military forces can do, especially in the homeland (Privacy rights, Posse Comitatus, Intelligence Oversight, Title 10/50)
- International Laws affecting electronic communications
- Military Law (UCMJ, Nat'l Security Act, Foreign Intel Surveillance Act, etc.)
- Law of Armed Conflict (jus ad bellum, jus in bello, principles of discrimination & proportionality, targeting, combatants)
- Potential use of cyber capabilities as weapons of mass destruction/effects

These six competency areas were further classified by using Bloom's taxonomy to ensure each officer receives the correct education at the appropriate time during the officer's career. At the pre-commissioning level, the working group recommended new officers be taught the six main competency areas at the Knowledge level. Table 3 lists their findings.

Table 3: Pre-commissioning Cyber Competency Areas

<p style="text-align: center;"><u>Nature & Characteristics of the Domain</u></p> <ul style="list-style-type: none">• Cyberspace domain is an operational domain consisting of the entire electromagnetic spectrum (EMS), networks, and electronic systems• Compare / contrast with other domains of air, land, space, and sea• Cyberspace domain transcends all other domains <p style="text-align: center;"><u>Capabilities</u></p> <ul style="list-style-type: none">• The AF has a broad range of capabilities that operate in cyberspace, such as network capabilities and electronic warfare• Capabilities include offense, defense, and support• Capabilities are planned and employed in conjunction with operations in other domains to achieve national security objectives <p style="text-align: center;"><u>Functions</u></p> <ul style="list-style-type: none">• AF functions (e.g. Information Operations, Integrated Control Enablers, etc.) are performed to achieve effects in support of national security objectives• Strategic attack, cyberspace control, cyberspace interdiction, etc. <p style="text-align: center;"><u>Integration & interrelationships</u></p> <ul style="list-style-type: none">• Interrelationship between air, space, and cyberspace forces is complex.• Cyberspace capabilities can support and enhance activities in other domains• Activities in other domains can support & enhance cyberspace operations• Cyberspace is crucial to effectiveness in other domains• Integrating these forces at the operational level is complex• Distinguish between cyberspace and information operations—AF position is that cyberspace is not just a rehash of IO, rather IO attains effects in cyberspace• Military Services' primary roles, missions and organizations <p style="text-align: center;"><u>Employment of cyberpower</u></p> <ul style="list-style-type: none">• Organizing for effective employment of cyberpower• Primary missions and responsibilities of the combatant commands• Instruments of national power – cyberspace increasing the importance of information• Effective application of air, space and cyberpower: compress kill chain, secure C2, cross-domain dominance• Tenets / principles of air, space, and cyberspace• 24 x 7 x 365 cyber effects at all levels of war
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Law, policy & ethics

- There are restrictions on what military forces can do, especially in the homeland (Posse Comitatus, Intelligent Oversight, Title 10/50)
- Law of Armed Conflict (jus ad bellum, jus in bello, principles of discrimination & proportionality, targeting, combatants)
- Appreciate cyberspace's use as a potential WMD/E

After commissioning, the first professional military education school that a second lieutenant attends is the Air and Space Basic Course. For this portion of a company grade officer's information operations education, the Air Force Institute of Technology working group recommended the six cyber core competencies areas be taught at the Knowledge and Comprehension levels. Table 4 represents the working group's vision of what competencies should be taught in each area.

Table 4: Air and Space Basic Course Cyber Competency Areas

Nature & Characteristics of the Domain

- Definition of a "military domain of operations"
- Cyberspace as an operational domain—i.e., a place where we conduct operations to achieve effects and exert will over the adversary
- Compare / contrast with other domains of air, land, space, and sea
- Cyberspace domain is an operational area consisting of the entire electromagnetic spectrum (EMS), networks, and electronic systems
- Characteristics, physics, boundaries, etc.
- Cyberspace domain transcends all other domains
- Know the organization for national security and how defense organizations fit into the overall structure (Modification)

Capabilities

- The AF has a broad range of capabilities that operate in cyberspace, such as network capabilities and electronic warfare, and Influence operations
- Capabilities include offense, defense, and support
- Capabilities are planned and employed in conjunction with operations in other domains to achieve national security objectives
- Understand fundamentals of information operations

Functions

- AF functions (Information Operations, Integrated Control Enabler, etc.) are performed to achieve effects in support of national security objectives
- Strategic attack, cyberspace control, cyberspace interdiction, etc.
- Functions include Information Operations, Integrated Control Enablers, Counterspace, etc.
- Students will know how the functions support, integrate with, and depend on other functions

Integration & interrelationships

- Cyberspace capabilities can support & enhance activities in other domains
- Activities in other domains can support & enhance cyberspace operations
- Cyberspace is crucial to effectiveness in other domains
- Integrating these forces at the operational level is complex
- Distinguish between cyberspace and information operations—AF position is that cyberspace is **not** just a rehash of IO, rather IO attains effects in cyberspace
- Interrelationship between air, space and cyberspace forces is complex.

Employment of cyberpower

- Primary missions and responsibilities of the combatant commands
- Organizing for effective employment of cyberpower
- Know the effects that can be achieved with information operations and the implications for tactical operations.
- Instruments of national power – cyberspace increasing the importance of information
- Effective application of air, space and cyberpower: compress kill chain, secure C2, cross-domain dominance
- Tenets / principles of air, space, and cyberspace
- 24 x 7 x 365 cyber effects at all levels of war
- Know that first priority is to control / dominate all three domains—whoever controls cyberspace generally controls the air, the land, the sea, and space
- Military Services' primary roles, missions and organizations
- Know the capabilities of other Services' weapon systems pertinent to the Service host-school systems & and the synergistic effect gained from effective use of their joint capabilities

Law, policy & ethics

- Recognize how factors such as geopolitics, culture and religion play in shaping planning and execution of joint force operations. Understand the impact of cyberspace and international communications infrastructure
- US laws (criminal, administrative, and civil)
- Restrictions on what military forces can do, especially in the homeland (Posse Comitatus, Intelligent Oversight, Title 10/50)
- Rules of Engagement (ROE) and tailored response options
- International Laws affecting electronic communications
- Military Law (UCMJ, Nat'l Security Act, Foreign Intel Surveillance Act, etc.)
- Law of Armed Conflict (jus ad bellum, jus in bello, principles of discrimination & proportionality, targeting, combatants)
- Understand cyberspace's use as a potential WMD/E

The second professional military education school that a company grade officer attends is the Squadron Officer School. Similar to the Air and Space Basic Course, the Air Force Institute of Technology working group recommended the six cyber core competency areas be taught at the Knowledge and Comprehension levels. Table 5 illustrates the working group's recommendation for these areas.

Table 5: Squadron Officer School Cyber Competency Areas

Nature & characteristics of the domain

- Definition of a “military domain of operations”
- Cyberspace as an operational domain—i.e., a place where we conduct operations to achieve effects and exert will over the adversary
- Compare/ contrast with other domains of air, land, space, and sea
- Cyberspace domain is an operational area consisting of the entire electromagnetic spectrum (EMS), networks, and electronic systems
- Characteristics, physics, boundaries, etc.
- Cyberspace domain transcends all other domains
- Know the organization for national security and how defense organizations fit into the overall structure

Capabilities

- The AF has a broad range of capabilities that operate in cyberspace, such as network capabilities and electronic warfare and Influence operations
- Capabilities include offense, defense, and support
- Capabilities are planned and employed in conjunction with operations in other domains to achieve national security objectives
- Understand fundamentals of information operations

Functions

- AF functions (e.g. Information Operations, Integrated Control Enablers, etc.) are performed to achieve effects in support of national security objectives
- Strategic attack, cyberspace control, cyberspace interdiction, etc.
- Students will know how the functions support, integrate with, and depend on other functions

Integration & interrelationships

- Cyberspace capabilities can support & enhance activities in other domains
- Activities in other domains can support & enhance cyberspace operations
- Cyberspace is crucial to effectiveness in other domains
- Integrating these forces at the operational level is complex
- Distinguish between cyberspace and information operations—AF position is that cyber is **not** just a rehash of IO, rather IO attains effects in cyberspace
- Interrelationship between air, space and cyberspace forces is complex.

Employment of cyberpower

- Primary missions and responsibilities of the combatant commands
- Organizing for effective employment of cyberpower
- Know the effects that can be achieved with information operations and the implications for tactical operations
- Instruments of national power – cyberspace increasing the importance of information
- Effective application of air, space and cyberspace: compress kill chain, secure C2, cross-domain dominance
- Tenets / principles of air, space, and cyberspace
- 24 x 7 x 365 cyber effects at all levels of war
- Know that first priority is to control / dominate all three domains—whoever controls cyberspace generally controls the air, the land, the sea, and space
- Military Services' primary roles, missions and organizations
- Know the capabilities of other Services' weapon systems pertinent to the Service host-school systems and the synergistic effect gained from effective use of their joint capabilities

Law, policy & ethics

- Recognize how factors such as geopolitics, culture and religion play in shaping planning and execution of joint force operations
- Understand the impact of cyberspace and international communications infrastructure
- US laws (criminal, administrative, and civil)
- Restrictions on what military forces can do, especially in the homeland (Posse Comitatus, Intelligent Oversight, Title 10/50)
- Rules of Engagement (ROE) and tailored response options
- International Laws affecting electronic communications
- Military Law (UCMJ, Nat'l Security Act, Foreign Intel Surveillance Act, etc.)
- Law of Armed Conflict (jus ad bellum, jus in bello, principles of discrimination & proportionality, targeting, combatants)
- Understand cyberspace's use as a potential WMD/E

Investigative Question Number Four

4. What is the Air Force process for determining what subjects are taught and at what levels?

In order to be able to influence the professional military education curriculum, it is important to understand how the Air Force determines which subjects will be taught at each level of professional military education.

Currently, there is no formal process to determine what each level of professional military education should be teaching (E. Airola-Skully, personal communication, January 23, 2008). However, the Air Force is in the process of implementing a system called the Air Force Learning and Education Council, which will permit senior leadership to have input into proposed changes in the professional military education curricula. The Air Force Learning and Education Council will be composed of each Major Command Directorate of Manpower and Personnel (A1), Air University, the United States Air Force Academy, functional leadership, as well as contain Headquarters Air Force Directorate of

Manpower and Personnel (A1) members. The intent for this new council is that it will prioritize and vet the proposed changes, for both old and new subjects. While the Air Force Learning and Education Council has not been finalized yet, it is in the process of senior level leadership approval (E. Airola-Skully, personal communication, January 23, 2008).

The level at which each subject is taught is guided by the Basic/Intermediate/Senior Developmental Education Model. The primary level of professional military education teaches at the tactical level, the intermediate level of professional military education is taught at the operational level, while the senior level of professional military education is taught at the strategic level (E. Airola-Skully, personal communication, January 23, 2008).

Investigative Question Number Five

5. How can we influence the Professional Military Education Curriculum?

Each level of professional military education is influenced by numerous variables. At the joint level, the Chairman of the Joint Chiefs of Staff Instruction 1800.01, *Officer Professional Military Education Policy* and Joint Professional Military Education Special Areas of Emphasis, which are the results of joint staff and congressional initiatives, influence professional military education. In addition, the Chief of Staff, United States Air Force and Secretary of the Air Force's Special Areas of Emphasis also play a role in influencing professional military education curriculum. Furthermore, Air Force Doctrine, the Air Force Strategic Plan, and our evolving missions influence the curriculum. Lastly, the professional military education curriculum is influenced by student and faculty

feedback at each professional military education school (E. Airola-Skully, personal communication, January 23, 2008).

In addition to the influences mentioned above, the accreditation body, the Commission of Colleges, Southern Association of Colleges and Schools, influence professional military education curricula since the intermediate and senior levels of professional military education are degree granting institutions (E. Airola-Skully, personal communication, January 23, 2008).

Gaps in Current Curricula

Using the Air Force Institute of Technology Cyber Competency Areas Framework that has been vetted by information experts from around the Air Force, in combination with the syllabi of the pre-commissioning sources, as well as the lesson presentations from the Squadron Officer College, we can identify several areas that are missing for each level of a company grade officer's professional military education.

At the pre-commissioning level, neither the Air Force Officer Training School nor the Air Force Reserve Officer Training Corps directly address any of the six cyber core areas identified in our framework. Indirectly, the Air Force Officer Training School teaches a class about air and space functions, where counterinformation (now information operations), intelligence, surveillance, and reconnaissance, and command and control, are addressed along with the other fourteen key operational functions of the Air Force. Therefore, according to the Pre-commissioning Cyber Competency Areas portion of the Air Force Institute of Technology Cyber Competency Areas Framework, these schools are lacking in the nature and characteristics of the domain, capabilities, functions

(specifically, the strategic attack, cyberspace control, and cyberspace interdiction), integration and interrelationships, employment of cyberpower, and law, policy, and ethics cyber competency areas.

At the first level of primary professional military education, the Air and Space Basic Course is teaching a course about intelligence, surveillance, and reconnaissance. This lesson provides a very solid foundation for understanding the principles of intelligence, surveillance, and reconnaissance, as well as the concept of predictive battlespace awareness. The Air and Space Basic Course is also implementing a lesson, titled *Netcentric Warfare*, in March of 2008. In reference to the Air and Space Basic Course Cyber Competency Areas portion of the Air Force Institute of Technology Cyber Competency Areas Framework, this new lesson will focus on mostly on the nature and characteristics of the domain, capabilities, functions, and the integrations and interrelationships areas. This new lesson, however, will not cover the employment of cyberpower or law, policy, and ethics areas. Within the four areas that the lesson will address, there are also some gaps according to our framework.

First, under the nature and characteristics of the domain area, this lesson does not compare and contrast cyberspace with the air and space domains, nor does it teach the students the organization (in relation to cyberspace) for national security and how the defense organizations fit into the overall structure. Second, under the capabilities area, the new lesson doesn't address the fundamentals of information operations. The lesson does cite Air Force Doctrine Document 2-5's definition of information operations, but it doesn't delve into what constitutes the three pillars of information operations. In

addition, while the new lesson teaches that information operations are employed across all three domains, it doesn't link these operations to achieve national security objectives.

Third, in the functions area of the framework, strategic attack, cyberspace control, and cyberspace interdiction are not taught. Also, similar to the capabilities area, there is no emphasis on using Air Force functions to achieve national security objectives. Fourth, under the integration and interrelationships area, the new lesson doesn't address the complexities of integrating air, space, and information operations. More importantly, this lesson doesn't point out that cyberspace is crucial to effectiveness in other domains. Now that we have examined the gaps in the Air and Space Basic Course, as determined by the Air and Space Basic Course Cyber Competencies portion of the Air Force Institute of Technology Cyber Competency Areas Framework, we can analyze the information operations education provided during the second level of primary professional military education.

At the second level of primary professional military education, the Squadron Officer School is teaching lesson tilted *Information Operations*. Compared to the Air Force Institute of Technology Cyber Competency Areas Framework, there are many missing areas.

First, the Squadron Officer School lesson does not address any aspects of the nature and characteristics of the domain area. Excluding a quote from a post Operation Desert Storm senior military leader as to cyberspace potentially becoming the preferred medium of future attacks, there is no other mention of cyberspace in the lesson. However, the lesson does an adequate job of teaching the capabilities portion of the

framework. As for the functions portion of the framework, the lesson does teach about the integrated control enablers, as defined by Air Force Doctrine Document 2-5.

However, similar to the Air and Space Basic Course, the lesson doesn't address strategic attack, cyberspace control, or cyberspace interdiction.

As for the three remaining areas of the Squadron Officer School portion of the Air Force Institute of Technology Cyber Competency Areas Framework, the information operations lesson didn't address them at all.

Redundancies

When one compares the Air and Space Basic Course and the Squadron Officer School curricula side by side, it becomes readily apparent that there are numerous redundancies between the two curricula. Since most of the lessons are taught at the first two levels of comprehension and knowledge on the Bloom's taxonomy classification scheme, there exists numerous opportunities to make better use of students' time.

In order to not confuse the reader, it is important to define how the Squadron Officer College identifies its lessons. For each Air and Space Basic Course lesson, the lesson number will begin with an "A" followed by a four digit code. This four digit code refers to one of the five areas the lesson falls under. A 1000 series lesson identifies the profession of arms area, a 2000 series lesson identifies the leadership area, a 3000 series lesson identifies a military studies area, a 4000 series lesson identifies the communication studies area, and a 5000 series lesson identifies an international security studies area. The Squadron Officer School uses the same numbering scheme except its lesson numbers begin with an "S".

The majority of the redundancies exist in the military studies area. Of the ten lessons in the Squadron Officer School, at least eight of them contain redundant lesson objectives that are being taught in the Air and Space Basic Course. In order to reinforce this point, we will first examine each Squadron Officer School lesson in the military studies area and indicate where redundancies exist. Objectives from both Squadron Officer College courses were taken from the curricula received from the Squadron Officer College staff.

First, lesson S3010, *Evolution of Air Power Doctrine*, has two objectives. The first objective is to comprehend how pre-WWI United States airpower doctrine evolved from the military history and theories of the early 20th century. The second objective is to comprehend the relationships among theory, doctrine, objectives, strategies, and operational experience, and the effects of contextual and operational elements on military operations. The first objective matches closely with an objective of lesson A3020, *Early Airpower Theory*. In this lesson, students are taught to know the early airpower theorists and their theories, and how they influenced air and space power doctrine. The second objective of lesson S3010 is covered by two objectives in lesson A3010, *Theory, Doctrine, Objective, and Strategy (TDOS)*. These two objectives are to comprehend the “Theory, Doctrine, Objectives, and Strategy” (TDOS) model of doctrine evolution, and how contextual elements and operational elements interact with the TDOS model.

Second, lesson S3030, *Applications of Air Power: World War II, the Cold War, and the Korean War*, has one objective, which is to comprehend how United States air power doctrine evolved during World War II. Lesson A3030, *Strategic Bombardment*

and Beyond, contains an objective to value doctrine in response to operational experiences during World War II.

Third, the objective of lesson S3040, *Applications of Air Power: The Early Cold War and Korea*, is to comprehend how United States air power doctrine evolved post World War II through the Korean War. The Air and Space Basic Course, lesson A3040, *Doctrinal Debates in Korea and the Cold War*, requires students to value the challenges faced during the Korean War and the Cold War and become familiar with how these challenges impacted air and space doctrine's evolution during the United States Air Force's first 50 years.

Fourth, lesson S3050's, *Applications of Air Power: The Late Cold War and Vietnam*, objective is to comprehend how post Korean War theories, doctrine, objectives, and strategies evolved during the Vietnam War and how contextual and operational elements affected them. Although not an exact match, lesson A3045's, *Airpower Success and Failures in Vietnam*, objective of valuing the significance of airpower in Vietnam and the impact of operational experiences on the development of today's air and space power doctrine is very similar to lesson S3045's objective.

Fifth, lesson S3060, *Applications of Air Power: Gulf War*, seeks to have students understand the application of air power throughout the Gulf War via objectives, strategies, contextual elements, and operational elements. In lesson A3050, *Operation Desert Storm*, the course objective is to know how the United States and coalition forces planned and executed Operation Desert Storm. While the course objectives are not exactly the same, it seems as if there is definitely overlap between them.

Sixth, in lesson S3080, *Operation Enduring Freedom*, one of the objectives is to discuss lessons learned during this campaign. The second objective of this lesson is to discuss how campaign planning for Operation Enduring Freedom evolved through each step of the Theories, Doctrine, Objectives, and Strategies Model. Lesson A3060, *Operation Enduring Freedom*, requires students to value how lessons learned from the conflict affected doctrine. In addition to this objective, there are also three other objectives, two of which deal with national, operational, and contextual elements.

The seventh lesson, S3090, *Operation Iraqi Freedom*, lists its objective as to value the military capabilities that evolved with changing Air Force doctrine as demonstrated in the Air Force support objectives for Operation Iraqi Freedom. While this objective is different from those listed for A3065, *Operation Iraqi Freedom*, it seems as if the two lessons would contain overlapping material.

The last lesson, S3910, *Tuskegee Airmen*, has exactly the same objective as A3910, *Tuskegee Airmen*, which is to appreciate the experiences of the Tuskegee Airmen and their role in air and space power history.

The next area where redundancies exist is in the international security studies area. Of the four Squadron Officer School lessons in this area, three lessons have objectives that are taught in the Air and Space Basic Course.

The first lesson, S5020, *Causes of War*, seeks to have students know the primary reasons nations go to war. However, in lesson A5010, *Conflict*, one of the objectives is to comprehend the nature of conflict.

Second, in lesson S5030, *National Security Strategy and Instruments of Power*, one of the two objectives is to comprehend how the national instruments of power are used to achieve security objectives. Lesson A5010, *Conflict*, requires students to comprehend the United States instruments of power and when they are used. For the second objective in lesson S5030, there is no similar objective in any of the Air and Space Basic Course lessons.

The two objectives of the last lesson in the international studies area, S5920, *War on Terrorism*, is exactly the same as A5920, *War on Terrorism*, which is to value the significance of the Al Qaeda terrorist threat and to value the importance of effectively countering the threat from terrorism.

The last area where redundancies exist is in the communication studies area. Within this area, the main focus is on being able to effectively write and speak. Lesson S4220, *Speaking Effectively and Job Brief Assignment*, lesson S4230, *Job Brief Assignment*, lesson S4240, *ISS Briefing Assignment*, and lesson S4250, *ISS Briefing* are all roughly comparable to lessons A4310, *Briefing Skills*, and A4320, *Briefings*. The objectives of the Squadron Officer School lessons are to either comprehend the elements of effective briefing or to analyze briefing/speaking abilities. The objectives of the Air and Space Basic Course lessons are to know which delivery skills enhance a briefing, know the specific characteristics that make visual aids effective in a briefing, value the impact of briefing abilities on your profession, and then apply effective briefing skills.

While there are some similarities in the communications area writing lessons, the focus seems to be different for each area. As an example, in the Air and Space Basic

Course, the lesson's objective is to know how bullet statement writing affects the enlisted force. In the Squadron Officer School, the focus is on actual application of bullet statement writing techniques.

Now that we have identified some opportunities for optimization of the Squadron Office College Curriculum, let's examine some recommendations for incorporating information operations theory into the corporate Air Force.

Recommendations

As the previous investigative questions have shown, there is a need to better incorporate information operations education in the company grade officer ranks. The purpose of this section is to provide recommendations to accomplish this objective. The recommendations will focus on the pre-commissioning level to the primary professional military education level for company grade officers.

At the pre-commissioning level, the research has shown there is very little being provided in the way of an information operations education. Rather than build an entire course, which takes an enormous amount of resources, especially manpower, time, and financial resources, Air University could take an existing information operations fundamentals course and provide it to the pre-commissioning sources. Depending on the resources available, there are two courses that would be appropriate for soon-to-be second lieutenants. As a side note, the author has taken both of these courses while stationed at the Air Force Information Warfare Center.

The first option, the Information Operations Fundamentals Course, would be the cheapest option. This 25-hour self-paced course was developed for the Air Force

Information Warfare Center (now the Air Force Information Operations Center) and is administered by the Vermont Air National Guard. The course teaches information operations fundamentals using a distance learning methodology. All course content is derived from Air Force Doctrine Document 2-5. Currently, this course is being used as a pre-requisite for both the 39 Information Operations Squadron's Information Operations Integration Course and the Air Force Information Operations Center's Information Operations Qualification Training. At the Air Force Information Operations Center, the Information Operations Fundamentals Course is used to teach personnel from various ranks and career fields (i.e. security forces to pilots) who have never been exposed to information operations before. This course is being conducted twelve times a year with an enrollment of approximately sixty students per class.

The second alternative course that could be taught at the pre-commissioning level is the Information Warfare Applications Course. This is a week long course that also teaches students the fundamentals of information operations, according to Air Force Doctrine Document 2-5. The difference between this course and the Information Operations Fundamentals Course is the latter is taught via distance learning and the former is taught in-residence at Maxwell Air Force Base, Alabama. However, the Information Warfare Applications Course does have the ability to be taught at different locations. As an example, this course was taught at Lackland Air Force Base, Texas, for the Air Force Information Warfare Center in 2006. This course is currently being taught eight times a year with an enrollment of seventy to eighty students.

While both of these classes do a phenomenal job of teaching information operations fundamentals, the author would recommend the Information Operations Fundamentals Course rather than the Information Warfare Applications Course be taught at the pre-commissioning level. This is due mostly to cost and logistics. It is significantly easier and cost-effective to teach students via distance learning than to bring actual instructors to each location. In addition to ease and cost, the self-paced style of the Information Operations Fundamentals Course would fit more easily into the already crowded schedules of Air Force Officer Training School trainees, United States Air Force Academy cadets, and Air Force Reserve Officer Training Corps cadets. Inclusion of the Information Operations Fundamentals Course could be done without lengthening any of the pre-commissioning sources' schedules.

At the Air and Space Basic Course, the author recommends taking two courses of action. First, the proposed Netcentric Warfare lesson should be expanded. In its current proposed form, the new lesson will cover several areas of the Air Force Institute of Technology Cyber Competency Areas Framework. However, the two core areas of employment of cyberpower and laws, policy, and ethics are not addressed. These two areas should be addressed as they play a vital role in the successful deployment of information operations. In addition to these two areas, there are several aspects (as identified in the Gaps in Current Curricula section) that should also be included in the lesson. The proposed lesson could be lengthened by an hour to address these gaps in the framework. Second, the air power history lessons (A3010 to A3080) could also be expanded to incorporate some of the Squadron Officer Squadron material in an effort to

eliminate some redundancies between the two courses. While all the lessons provide value, there are a few that could be removed to make the proposed modification. Eliminating lessons such as C07, *What Would You Do*, A2305, *Four Lenses Personality and Temperament Test*, and C012, *AEF Brain Teaser* could free up four hours and fifty minutes.

At the Squadron Officer School, the author recommends a very short review of airpower theory to make more room for information operations theory. This review should encompass two hours, as none of the material would be new. Currently, the Squadron Officer School spends eight hours reviewing air power theory, excluding the Tuskegee Airman briefing. This six hour savings could be used to expand the current information operations curriculum.

Specifically, the expanded information operations curriculum should differentiate between information operations and cyberspace, as they are sometimes incorrectly used interchangeably. In addition, the three areas of the Squadron Officer School portion of the Air Force Institute of Technology Cyber Competency Areas Framework need to be taught. For the employment of cyberpower area, the author recommends that students be taught the concepts at the tactical level. For the law, policy, and ethics area, a local judge advocate general (from the local judge advocate general school) could teach that portion. The best forum for this lesson may be the large Squadron Officer School auditorium.

While the Squadron Officer College Cadre may not have many personnel who have experience with information operations, the cadre could contact the Information

Warfare Applications Course Instructors for outside assistance, to assist in developing new course content.

Finally, the author recommends that the Squadron Officer School insist that incoming students read Air Force Doctrine Document 2-5 before their arrival. Currently, the Squadron Officer School suggest several readings for incoming students, all of which are doctrine documents (Squadron Officer School, 2008).

Summary

This chapter answered the last three investigative questions presented in the first chapter. The third investigative question was answered by using the Air Force Institute of Technology Cyber Competency Areas Framework to determine what the subject content for each level of a company grade officer's development should be. The fourth investigative question was answered by identifying the Air Force process for determining how subject content is selected for each professional military education school. The last investigative question was answered by examining the factors that influence professional military education. After these investigative questions were answered, gaps in the current information operations education as determined by the Air Force Institute of Technology Cyber Competency Areas Framework were identified. To assist in resolving these gaps, redundancies between the Air and Space Basic Course and Squadron Officer School curricula were uncovered, and several recommendations to fill the gaps were proposed. Chapter Five will provide the overall conclusions, areas for future research, and the significance of this research effort.

V. Conclusions and Recommendations

Chapter Overview

The objective of this research effort was to determine an end state for company grade officers in terms of an information operations education. This chapter identifies this end state. In addition, the significance of this research is demonstrated, as are future areas for further research.

Conclusions of Research

This research effort has proven that a need exists at the company grade officer level for an expanded information operations education, from the pre-commissioning sources to the primary levels of professional military education. However, to conclude this research effort, the overarching research question needs to be answered.

Research Question

What is the desired end-state for company grade officers in terms of an information operations education?

The answer to this research question is the Air Force needs to have company grade officers who can intelligently discuss, implement, and further develop information operations and its associated doctrine at the tactical level. In order to achieve this goal, company grade officers need a solid foundation which permits them to blend air, space, and information operations to provide synergistic effects. Currently, company grade officers are receiving an adequate education in air and space operations theory. To fully groom company grade officers into the future leaders that our service will require, it is

imperative that we modify our current curricula to provide a more thorough information operations education.

Significance of Research

With the addition of cyberspace to the Air Force mission statement, a new arena of operations has become the focus of our service. While we have undoubtedly gained the ability to obtain air and space superiority in the air and space domains, our ability to obtain and maintain cyber superiority in cyberspace is still questionable. Without its members having a solid foundation in information operations theory, the Air Force's need to obtain this cyber superiority will be hampered in several ways. First, Air Force members will not be able to blend air and space operations with information operations to provide the necessary synergistic effects. Second, without the fundamental knowledge of what information operations can bring to the fight, many non-kinetic options may be taken off the table due a lack of awareness. Third, many potential competitors are exploring the possibility of using a cyberspace-based attack to threaten our national interests. Without the ability to obtain and maintain cyber superiority, the Air Force, and our military in general, places our national security in grave danger.

Recommendations for Action

As this research effort has demonstrated, there are some gaps between what is currently being taught to company grade officers and what should be taught to company grade officers in terms of an information operations education, as determined by the Air Force Institute of Technology Cyber Competency Areas Framework.

In order to rectify this problem, the author suggests implementing some of the recommendations presented in Chapter Four. In particular, at the Squadron Officer College level, the author recommends following the same strategy the Air Force Institute of Technology took to develop its Cyber Competency Areas Framework. Initially, they formed a working group to brainstorm ideas about what an information operations education should encompass. After these competencies were generated, they were sent out to various information operations experts around the Air Force to be vetted. The information operations experts' inputs were added to the framework, resulting in a product that can withstand scrutiny, from both academia and operational forces.

Using this strategy, the Squadron Officer College Cadre can use the Air Force Institute of Technology Cyber Competency Areas Framework as a beginning point. Once the cadre develops a curriculum that looks as if it will satisfy the Air Force Institute of Technology Cyber Competency Areas Framework, they can send it to the information operations experts across the Air Force for vetting. After receiving and implementing their inputs, the Squadron Officer College curricula would be current (which is a challenge given today's rapidly evolving technology) and would fulfill the critical need of providing a solid information operations education for company grade officers.

Recommendations for Future Research

There are numerous areas for future research concerning the subject of integrating the information operations into the corporate Air Force. First, this research effort could be duplicated. Since the Squadron Officer College and pre-commissioning sources' curricula are constantly evolving, a future research effort would most likely draw

different conclusions. This future research effort could be used as a yardstick to see how far the Squadron Officer College and pre-commissioning sources have come in terms of expanding their information operations curricula.

Second, this research effort could be duplicated using field grade officers as the vehicle for integrating information operations theory into the corporate Air Force. To aid in this endeavor, the Air Force Institute of Technology Cyber Competency Areas Framework could be used as the yardstick for determining if a need exists for modifying the curricula at the Air Command Staff College and the Air War College. A potential expansion on this subject would be to compare the other services' Intermediate and Senior Service Schools to the Air Force Institute of Technology Cyber Competency Areas Framework. Since the 2003 Information Operations Roadmap identifies a lack of a full understanding of information operations among the general military population as a problem, the exploration of different service schools' information operations curricula would be warranted.

Third, this research effort could also be duplicated using the enlisted ranks as the vehicle for integrating information operations theory into the corporate Air Force. The Air Force Institute of Technology of Cyber Competency Areas Framework also has an area that addresses the different levels of enlisted professional military education, ranging from basic training to the Senior Noncommissioned Officer Academy. An examination of these professional military education sources could lead to a partial resolution of the problem of the general military not fully understanding information operations.

Summary

While the Squadron Officer College does a phenomenal job of educating our company grade officers, the rapid evolution and increasing importance of cyberspace demands we more effectively integrate information operations into the company grade officer ranks. This research effort has proven that point by assessing the current education company grade officers receive, from the pre-commissioning sources to the primary level of professional military education. While several recommendations have been provided for integrating information operations theory into the company grade officer ranks, each has costs that must be seriously considered before implementation can be made possible. While some of these costs may seem high, the failure to properly educate our company grade officers will be higher. Due to the fact that no other nation-state or potential enemy can challenge the United States in the air, space, land, or sea domains, our next threat will most likely come from cyberspace. Failure to properly educate our company grade officers now could easily lead to loss of air and space superiority in the future.

Appendix A: ASBC Curriculum

1000 AREA - MILITARY STUDIES	
Airman Attitude	<ul style="list-style-type: none"> -Value the unique warfighting perspective of the United States Air Force. -Value the opportunity of the Air and Space Basic Course. -Value how the right attitude is the essential factor in accomplishing the Air Force mission.
Introduction to ICARUS	<ul style="list-style-type: none"> -Apply the air and space power operational functions. -Apply effective teambuilding skills. -Apply the principles of the ASBC problem-solving model.
ICARUS Execution	<ul style="list-style-type: none"> -Respond positively to the importance of air and space power functions in air and space operations. -Respond positively to the importance of the AF distinctive capabilities in air and space operations. -Respond to discussion on the impact of the TDOS model in air and space operations -Respond to discussion about teambuilding and problem solving throughout Icarus -Respond to discussion concerning air and space operations planning and execution.
Air & Space Systems & Capabilities	<ul style="list-style-type: none"> -Know selected current air and space systems -Know the mission and characteristics of selected current air and space systems.
Air & Space Power Functions	<ul style="list-style-type: none"> -Know the USAF core competencies -Comprehend the air and space power operational functions.
Force Packaging	<ul style="list-style-type: none"> -Respond to discussion on the benefits of force packaging. -Respond to a discussion on the intricacies of assembling an effective force package to achieve the objectives of air and space operations.
Intro to AFEX	<ul style="list-style-type: none"> -Know the definition of wargaming. -Respond to discussion on the purpose of wargaming. -Respond with interest to the opportunity to build and execute a war plan.
AFEX	<ul style="list-style-type: none"> -Value the importance of preparation and planning to the implementation of a mission plan that successfully satisfies assigned objectives. -Value the importance of force packaging to preserve and economically utilize resources during the execution of a complex airpower mission. -Value the importance of cooperation and teamwork to the success of the team.
Distinctive Capabilities I	<ul style="list-style-type: none"> -Know Air and Space Superiority, Information Superiority and Rapid Global Mobility as USAF Distinctive Capabilities. -Respond to discussion on how the Distinctive Capabilities of Air and Space Superiority, Information Superiority and Rapid Global Mobility contribute to joint operations.
Distinctive Capabilities II	<ul style="list-style-type: none"> -Know Global Attack, Agile Combat Support & Precision Engagement as Distinctive Capabilities. -Respond to discussion on how the Distinctive Capabilities of Global Attack, Agile Combat Support, and Precision Engagement contributes to joint operations.
AIRGAP	<ul style="list-style-type: none"> -Value the importance of each of the USAF Distinctive Capabilities in air and space operations. -Value the use of wargaming and simulations in preparing for air and space operations.
Joint Organization	<ul style="list-style-type: none"> -Respond to discussion on the importance of the services fighting jointly. -Know the significance of the Goldwater-Nichols Act of 1986. -Know the nine Unified Commands. -Know selected command relationships. -Know the roles of the Joint Force Air Component Commander (JFACC).
USAF Organization	<ul style="list-style-type: none"> -Know the operational domains. -Know how the USAF presents its forces for planning and execution to a joint force. -Appreciate the problems in the current MAJCOM and NAF structure
Operational Domains	<ul style="list-style-type: none"> -Know the operational domains. -Know key principles of the US Army, Navy, and Marine Corps. -Know the sister services' view of airpower.
Special Operations	<ul style="list-style-type: none"> -Know Special Operations Forces (SOF) and how they operate.

Air & Space Power	<ul style="list-style-type: none"> -Know the definition of the AOC Weapon System and its divisions. -Appreciate the relationships between selected Air and Space Operations Center (AOC) divisions. -Know the steps of the ATO cycle within the AOC. -Know the mission and organizational structure of the Wing Operations Center (WOC). -Positively respond to the WOC mission and organizational structure presented. -Respond positively to discussion on the relationship and interaction between the Air and Space Operation Center (AOC) and the WOC and you role within the WOC.
Air Operations Directive	<ul style="list-style-type: none"> -Know the impact the Air Operations Directive (AOD) has on the Air Operations Center (AOC) operations. -Know the purpose of the AOD. -Know how the AOD is developed. -Respond positively to the AOD.
Space Fundamentals	<ul style="list-style-type: none"> -Know how space power contributes to warfighting -Respond to discussions on the role of space forces in warfare.
ISR Ops	<ul style="list-style-type: none"> -Know the concept of Intelligence, Surveillance, and Reconnaissance (ISR) Operations. -Know how Intelligence, Surveillance, and Reconnaissance enhance warfighting.
Air & Space Expeditionary Force	<ul style="list-style-type: none"> -Know the Air and Space Expeditionary Force (AEF) Concept. -Know the force management tools of the AEF Concept
Total Force	<ul style="list-style-type: none"> -Know the Total Force concept. -Appreciate the Total Force concept.
Joint Planning	<ul style="list-style-type: none"> -Know contingency planning and crisis action planning (CAP) processes
Joint Air Estimate Process	<ul style="list-style-type: none"> -Know the joint air estimate process (JAEP). -Know the phases of the JAEP.
Methods of Targeting	<ul style="list-style-type: none"> -Know the principle of effects-based targeting -Know selected methods of targeting. -Appreciate how Col (Ret) Warden's Five Rings, the Dr. Strange Model, and Nodal Analysis can be used together to identify specific targets. -Respond to discussion on how to use the principle of effects-based targeting and the methods of targeting to achieve desired effects.
Deployment Process	<ul style="list-style-type: none"> -Know the USAF War and Mobilization Plan (WMP), Unit Type Code (UTC), Time-Phased Force Deployment Data (TPFDD), and deployment readiness. -Know the role of the WMP in joint planning. -Know key roles in the USAF's deployment planning process. -Know your role and responsibilities for deployment readiness at the tactical level. -Respond to your role in planning and readiness at the tactical level.
JAEP Phase I - Mission Analysis	<ul style="list-style-type: none"> -Know the Joint Air Estimate Process. -Know Phase I of the JAEP.
LUNA JAEP Phase II - Situation and COA Development	<ul style="list-style-type: none"> -Apply COA development concepts for Blue Thunder III air campaign planning.
VULCA JAEP Phase II - Situation and COA Development	<ul style="list-style-type: none"> -Apply COA development concepts for Blue Thunder III air campaign planning.
LUNA JAEP Phase III-V	<ul style="list-style-type: none"> -Apply COA analysis, comparison & selection concepts for Blue Thunder III air campaign planning.
VULCA JAEP Phase III-V	<ul style="list-style-type: none"> -Apply COA analysis, comparison & selection concepts for Blue Thunder III air campaign planning.
JAEP Phase VI - JAOP Development	<ul style="list-style-type: none"> -Comprehend the Joint Air Operation Plan Development.

Blue Thunder III Debrief	<ul style="list-style-type: none"> -Value the lessons learned during Blue Thunder III wargame and their relationship to Air Force Distinctive Capabilities. -Appreciate the value of teamwork and its use in accomplishing the mission.
LOAC & Code of Conduct	<ul style="list-style-type: none"> -Comprehend the Law of Armed Conflict (LOAC). -Comprehend the difference between lawful and unlawful targets as well as lawful combatants, noncombatants and undetermined status. -Willingly respond to the Code of Conduct. -Value the importance of the Law of Armed Conflict & how it applies to military members.
Ethics, Values, & Moral Dilemmas	<ul style="list-style-type: none"> -Appreciate the concepts of ethics, morals, values, and officership. -Value the importance of ethics to the profession of arms -Value the importance of ethics to the profession of arms -Value the negative impact sexual assault has on the team.
Killed in Action: What it means for you	<ul style="list-style-type: none"> -Respond to your inherent risk of being killed in action (KIA). -Comprehend the effects that may occur in a tactical unit after a member is killed in action (KIA). -Respond to your role as an officer in a unit that loses a member because s/he was killed in action (KIA).
Survival Skills for the Lieutenant	<ul style="list-style-type: none"> -Know the resources available to help you manage your career. -The Objective of this lesson is for each student to respond to the resources available in preparation for an upcoming assignment. -The Objective of this lesson is for each student to respond positively to the concept of “taking care of yourself, your people, and the mission” during their tour. -The Objective of this lesson is for each student to respond to how adequate preparation for tour completion impacts career progression.
Distinguished Speaker	<ul style="list-style-type: none"> -Value the experiences of the inspirational speakers as they explain the significance of officership and share personal stories of the application of officership principles.
Profession of Arms Guest Speaker	<ul style="list-style-type: none"> -Value the experiences of the inspirational speakers as they explain the significance of the Profession of Arms and share personal stories of applying Profession of Arms principles.
Expeditionary Perspectives	<ul style="list-style-type: none"> -Value a company grade officer’s (CGO) leadership responsibilities in an area of responsibility (AOR). -Value the importance of the Warrior Ethos.
Chief Master Sergeant of the AF (CMSAF) Symposium	<ul style="list-style-type: none"> -Value the role and significance of current and former Command Chiefs and Chief Master Sergeants of the Air Force (CMSAF).
AEF Deployment Readiness	<ul style="list-style-type: none"> -Know the importance of being individually ready to deploy. -Appreciate the need for leading subordinates in preparation for deployment.
AEF Map and Compass	<ul style="list-style-type: none"> -Use a map and compass to navigate between two points.
AEF Employment	<ul style="list-style-type: none"> -Know basic health protection measures for the AEF. -Identify passive force protection considerations to be employed early in an AEF operation. -Appreciate your role as leaders and mentors in a deployed location.
AEF Fight	<ul style="list-style-type: none"> -Know the actions needed to properly react to an attack situation. -Appreciate your role as a leader and/or mentor will facilitate a unit’s ability to survive an attack.
AEF Survival	<ul style="list-style-type: none"> -Know the fundamentals of SABC in the deployed environment.
AEF Brain Teaser	<ul style="list-style-type: none"> -Know AEF warfighting skills in a deployed location.

2000 AREA - LEADERSHIP	
Warrior Run	-Characterize lifelong fitness behaviors
Physical Readiness Training	-Apply teambuilding and personal wellness skills in a physical activity
Fundamentals of Teambuilding and Problem Solving	-Know the COG's Ladder Model of group development -Know the seven essential building blocks needed for successful team building -Comprehend the six-step problem solving process -Respond to COG's Ladder Model of group development
Foundations of CGO Leadership	-Comprehend the foundational doctrine statements as outline in AFDD 1-1 -Comprehend the construct model for leadership and be able to differentiate the leadership competencies as outlined in AFDD 1-1 -Value the opportunities ASBC offers to new CGOs to develop USAF leadership competencies
Outdoor Teambuilding Exercise 2 (TC2)	-Apply team building and problem solving skills in a group situation
Team Challenge (1 and 3)	-Apply team building and problem solving skills in a group situation
Team Challenge X (TCX)	-Apply appropriate team building and problem solving skills in an outdoor activity
Peer Feedback	-Comprehend how personal strengths and areas of improvement relate to teambuilding
Senior Officer Perspectives	-Respond to senior officers' views on the military and their expectations of newly commissioned company grade officers
The Enlisted Force	-Know the Enlisted Force Development, the Enlisted Evaluation System, and the Enlisted Force Structure
Leadership and Management Guest Speakers	-Value the Air Force concept of leadership, basic leadership traits and principles, and the importance of effective teamwork
Combined Operations Administrative	-Students participate in an instructor-led orientation of the Combined Operations week to include emergency information, course materials, and instructions
What Would You Do? (WWYD)	-Analyze various characters and their issues and apply learned lessons' principles to the simulated situations -Value the impact the learned lessons' principles have on behavior
Values Exercise	-Embrace the importance that the value principles play in shaping people's behavior and impacting leadership effectiveness
Project X	-Value the role of the Company Grade Officer as a leader to the enlisted corps through the use of Project X -Value the role of the Senior Noncommissioned Officer as a mentor to the CGO through the use of Project X

3000 AREA - MILITARY STUDIES	
Theory, Doctrine, Objective, and Strategy (TDOS)	-Comprehend the "Theory, Doctrine, Objectives and Strategy" (TDOS) model of doctrine evolution. -Comprehend how contextual elements and operational elements interact with the TDOS model. -Know the three levels of war-strategic, operational and tactical. -Comprehend how airpower doctrine evolved through the end of WWI. -Value the significance of the origins of airpower, and how the operational experiences of WWI influenced the development of today's air and space power doctrine.
Early Airpower Theory	-Know the early airpower theorists, their theories, and how they influenced air and space power doctrine. -Value the significance of the early airpower theorists and how their theories influenced today's air and space power doctrine.

Strategic Bombardment and Beyond	<ul style="list-style-type: none"> -Value the significance of the strategic bombing campaigns of World War II and how operational experiences of the war were instrumental in developing today's air and space power doctrine. -Know key developments in airpower theory, strategy, and doctrine that arose in response to operational experiences during World War II, and how they influenced today's air and space power doctrine. -Value the significance of airpower advocates who promoted significant advances in airpower theory, strategy, and doctrine in response to operational experiences during World War II, and how their ideas influenced today's air and space power doctrine.
Doctrinal Debates in Korea & the Cold War	<ul style="list-style-type: none"> -Value the significance of both the challenges the United States faced in Korea and the Cold War as well as the impact these challenges had on the course of air and space doctrine's evolution throughout the Air Force's first 50 years as an independent Service.
Airpower Success and Failures in Vietnam	<ul style="list-style-type: none"> -Value the significance of airpower in Vietnam and the impact of operational experiences on the development of today's air and space power doctrine.
Operation DESERT STORM	<ul style="list-style-type: none"> -Know why the United States intervened in the Persian Gulf following Iraq's invasion of Kuwait. -Know how the US and coalition forces planned for and executed Operation DESERT STORM.
Operation ALLIED FORCE	<ul style="list-style-type: none"> -Comprehend the significance of coalition warfare on the execution of military power in Operation ALLIED FORCE (OAF). -Know the similarities and differences between the role and employment of air and space power in Operations ALLIED FORCE and DESERT STORM.
Operation ENDURING FREEDOM	<ul style="list-style-type: none"> -Comprehend the events that led to OEF. -Comprehend National and Operational objectives in OEF. -Comprehend how Contextual and Operational elements affected OEF. -Value how lessons learned from the conflict affected doctrine.
Operation IRAQI FREEDOM	<ul style="list-style-type: none"> -Know the history leading up to the start of Operation IRAQI FREEDOM (OIF). -Comprehend the effects of contextual elements on current air and space power doctrine at the start of OIF. -Comprehend how the operational functions of air and space power enabled distinctive capabilities used during OIF. -Value how lessons learned during OIF changed our doctrine.
Air War Iraq	<ul style="list-style-type: none"> -Value the military capabilities that evolved with changing USAF doctrine as demonstrated in support of JFC objectives for IRAQI FREEDOM. -Value the commander's view on the effort required to stand up and operate at forward operating bases.
Tuskegee Airmen	<ul style="list-style-type: none"> -Appreciate the experiences of the Tuskegee Airmen and their role in air and space power history.

4000 AREA - COMMUNICATION STUDIES	
Briefing Skills	<ul style="list-style-type: none"> -Know which delivery skills enhance a briefing -Know the specific characteristics that make visual aids effective in a briefing -Value the impact of briefing abilities on your professionalism -Know the requirements for the briefing exercise
Briefings	-Apply effective briefing skills
Public Affairs Training	<ul style="list-style-type: none"> -Identify key elements necessary to engage the media -Describe the impact of media operations on military operations -Describe the opportunities the media provides the AF by interviewing its members
Interpersonal Communications	<ul style="list-style-type: none"> -Know Interpersonal (IP) communication fundamentals -Value how individual and situational differences effect IP communications
Bullet Statement Evaluation Skills, Feedback Portion	<ul style="list-style-type: none"> -Comprehend how bullet statement evaluation skills and bullet writing skills impact the enlisted force -Value the importance of proper bullet statements and a desire to mentor others through proper feedback

5000 AREA - INTERNATIONAL SECURITY STUDIES	
Conflict	<ul style="list-style-type: none"> - Comprehend the nature of conflict. - Know the classifications that make up the range of military operations. - Comprehend the US instruments of power and when they are used. - Describe conflict resolution and why nations stop fighting. - Know the importance of a well-defined end state.
War on Terrorism	<ul style="list-style-type: none"> - Value the significance of the Al Qaeda terrorist threat. - Value the importance of effectively countering the threat from terrorism.

Appendix B: SOS Curriculum

1000 AREA - PROFESSION OF ARMS	
Accountability	<ul style="list-style-type: none"> -Comprehend AF standards of accountability. -Value AF standards of accountability.
Calico Harbor	<ul style="list-style-type: none"> -Know your personal moral and ethical standards.
Ethics and Core Values	<ul style="list-style-type: none"> -Appreciate the difference between ethics and values. -Value the potential for differences between ethics and values on a personal level and those at the Air Force level. -Value the Air Force Core Values. -Value the importance of integrating Air Force Core Values into daily life in the profession of arms.
Information Operations	<ul style="list-style-type: none"> -Comprehend Information Operations. -Value the importance of strong, knowledgeable leadership in implementing information operations capabilities as it relates to the Air Force mission statement.
Joint and Coalition Domains	<ul style="list-style-type: none"> -Comprehend the organization and structure of the Army, Navy, and Marine Corps. -Comprehend how the Army, Navy, and Marine Corps view the use of airpower. -Appreciate how Coalition forces are organized and view the use of airpower. (As applicable)
Air Force and Future Joint Concepts	<ul style="list-style-type: none"> -Comprehend why the DoD has formalized transformation. -Comprehend how the DoD intends to transform joint forces and how joint forces will conduct future operations. -Appreciate the Air Force's role in future joint operations. -Appreciate how the Air Force is transforming to meet the demands of a changing strategic environment.
Profession of Arms Guest Speakers	<ul style="list-style-type: none"> -Value the experiences of the inspirational speakers as they explain the significance of the Profession of Arms and share personal stories of applying Profession of Arms principles.
Fitness Assessment (FIST) and Warrior Challenge	<ul style="list-style-type: none"> -Value key attributes of the warrior ethos. -Apply sound decision making under mental and physical stress. -Apply adaptive thinking under mental and physical stress.
Warrior Symposium	<ul style="list-style-type: none"> -Value the significance and impact the profession of arms and Core Values had in the experiences of past and present military members.

2000 AREA - LEADERSHIP	
Team Building Exercise	-Respond to team building activities
Teambuilding	-Explain the team environment -Comprehend how individual and group behavior impact group development -Comprehend COG's Ladder
Commander's Intent	-Know the mission areas and their purpose -Understand how the SOS individual and team evaluation program works and how individuals and flights earn recognition -Value the seven Enduring Leadership Competencies from AFDD 1-1 as critical to one's development as an officer
Puzzle Group Exercise	-Know individual and flight communication and problem solving skills
APTEC	-Know the purposes and steps associated with each of the five stages of the APTEC cycle -Comprehend the purpose and actions required to accomplish each of the APTEC stages
Followership	-Comprehend Kelley's Followership Model -Comprehend exemplary followership techniques -Know the techniques of proper dissent
Situational Leadership	-Comprehend the principles of Situational Leadership
Sit Lead Case Studies	-Respond to the principles of Situational Leadership -Value the role of leadership in mission accomplishment
Decision Making and Goal Setting	-Comprehend goal setting strategies -Comprehend successful and unsuccessful approaches to decision making -Apply various Leadership Development Simulation principles learned during the Sim
Team Decision Making and Goal and Conflict Management	-Comprehend the impact of a team context on decision making tasks -Comprehend conflict in team settings -Apply various LDS leadership principles to avoid team decision making biases and resolve conflict
Team Structure and Culture	-Comprehend characteristics of various team/organizational structures -Identify the impact on individuals on creating, and/or changing team culture -Value the use of effective leadership skills to achieve mission goals
Operation Flickerball	-Apply AFDD 1-1 Leadership and Force Development principles to develop a comprehensive plan, brief a plan, and execute a plan within the stated ROE -Apply SOS Curriculum to build an effective Flickerball team, develop a comprehensive plan, brief a plan, and execute a plan within the stated ROE
Flickerball Practice	-Apply AFDD 1-1 Leadership and Force Development principles to develop a comprehensive plan, brief a plan, and execute a plan within the stated ROE
Flickerball Operations	-Apply SOS Curriculum to build an effective Flickerball team, develop a comprehensive plan, brief a plan, and execute a plan within the stated ROE

2000 AREA - LEADERSHIP	
TLP	<ul style="list-style-type: none"> -Apply effective team building skills -Apply effective problem-solving skills -Apply effective leadership skills to achieve mission goals -Apply principles of Situational Leadership -Apply the principles of effective followership -Analyze the effect of communication on leadership -Analyze the effect of communication on team building
Project X	<ul style="list-style-type: none"> -Apply effective team building skills -Apply the principles of the SOS problem-solving model -Apply effective leadership skills to achieve mission goals -Apply effective leadership and management skills -Apply the principles of effective followership -Analyze the effect of communication on leadership -Analyze the effect of communication on team building
Developing and Mentoring Your Airmen	<ul style="list-style-type: none"> -Comprehend responsible and effective developmental counseling techniques -Comprehend the function of mentoring in military leadership -Value the various roles and functions of a mentor
Reflections on Developmental Counseling	<ul style="list-style-type: none"> -Appreciate the importance of responsible and effective developmental counseling techniques -Value the opportunity to improve counseling skills, thereby more effectively developing subordinates
Promotion Board Exercise	-Comprehend the relationship between evaluation systems and promotions in the AF
Case Studies in Military Justice	<ul style="list-style-type: none"> -Know the specific actions available to the commander -Comprehend responsible and effective supervision techniques
Sexual Harassment Case Study	<ul style="list-style-type: none"> -Value what constitutes sexual harassment -Appreciate the effect sexual harassment has on the work environment -Appreciate the responsibilities of a leader regarding sexual harassment
Senior Officer Leadership Perspectives	-Respond to senior officers' perspectives on the profession of arms and their expectations of company grade officers
Leadership Guest Speaker	-Value the AF concept of leadership, basic leadership traits and principles, and the importance of effective followership

3000 AREA - MILITARY STUDIES	
Nature of Warfare	-Comprehend the classical schools of thought on the nature of war
Evolution of Air Power Doctrine	-Comprehend the relationships among theory, doctrine, objectives, strategies and operational experience and comprehend the effects of contextual and operational elements on military operations -Comprehend how pre-WWII US airpower doctrine evolved from the military history and theories of the early 20th century
Applications of Air Power: WWII, the Cold War, and the Korean War	-Comprehend how US airpower doctrine evolved during WWII
Applications of Air Power: The Early Cold War and Korea	-Comprehend how US airpower doctrine evolved post-WWII through the Korean War
Applications of Air Power: The Late Cold War and Vietnam	-Comprehend how post-Korean War theories, doctrine, objectives, and strategies evolved during the Vietnam War and how contextual and operational elements affected them
Applications of Air Power: Gulf War	-Comprehend how US airpower doctrine evolved through the Gulf War -Comprehend how the US application of airpower throughout the Gulf War through the objectives, strategies, contextual elements, and operational elements
Operation ENDURING FREEDOM	-Discuss how campaign planning for OEF evolved through each step of the TDOS Model -Discuss OEF lessons learned to date
Operation IRAQI FREEDOM	-Value the military capabilities that evolved with changing USAF doctrine as demonstrated in the Air Force support objectives for Operation IRAQI FREEDOM
Military Studies Guest Speakers	-Value the experiences of inspirational speakers as they explain a significant event in air and space power history
Tuskegee Airmen	-Appreciate the experiences of the Tuskegee Airmen and their role in air and space power history

4000 AREA - COMMUNICATION STUDIES	
Air Force Writing	-Understand selected writing techniques to improve your writing skills -Demonstrate how to produce written communication that's organized, supported, and clearly expressed
AFWA Feedback/ISS Writing Assignment	-Know individual writing abilities -Comprehend the requirements of the writing assignment
ISS Feedback	-Analyze ISS paper feedback to improve writing abilities
Writing OPRs	-Know techniques for writing effective OPR bullets
Effective OPR Bullets	-Apply effective writing techniques to OPRs
Speaking Effectively and Job Brief Assignment	-Comprehend elements of effective speaking -Comprehend the requirements of the Job Brief assignment
Job Brief Assignment	-Analyze briefing abilities
ISS Briefing Assignment	-Comprehend the requirements of the briefing assignment
ISS Briefing	-Analyze speaking abilities

5000 AREA - INTERNATIONAL SECURITY STUDIES	
Causes of War	-Know the primary reasons nations go to war
NSS & IOP	-Discuss relevant geopolitical issues and demonstrate how the National Security Strategy guide US involvement and/or decision-making -Comprehend how the national Instruments of Power (IOP) are used to achieve national security objectives
Middle East	-Value the importance of events and US policy in the Middle East
War on Terrorism	-Value the significance of the Al Qaeda terrorist threat -Value the importance of effectively countering the threat from terrorism

9000 AREA - ADMINISTRATION	
Stand-Up	-Be able to discuss flight plans and actions taken to accomplish the overall mission -Be able to discuss the flight's use of leadership tools and concepts to accomplish the overall mission
Flight Program Time	-Apply models and concepts presented in the course to accomplish each mission area goal
Feedback	-Comprehend personal strengths and areas of improvement in relation to AFDD 1-1 Enduring Leadership Competencies
FIST and Warrior Challenge	-Characterize lifelong fitness behaviors

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Vita

Captain Thomas R. Kettles Jr. is from Fort Lauderdale, Florida. He graduated from the University of Maryland University College in August of 2000 with a Bachelor of Science in Information Systems Management and was commissioned a second lieutenant in June of 2001. After his initial assignment at Fairchild Air Force Base, Washington, he was transferred to the Air Force Information Warfare Center, Lackland Air Force Base, Texas.

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